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MODERN Machine Shop

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German Locomotive Repair Methods and Tools

BY RENE W. P. LEONHARDT

Consulting Engineer, Berlin, Germany

THE German State Railways Testing Station at Gottingen has for years been developing methods for the more economic construction and repair of locomotives, the most recent of which apply to the machining of journal box pedestals. The starting-point in this particular case was the recognition of the fact that inferior machining of the pedestals, which is usually a result of the taking of inaccurate measurements, is responsible for undue wear and tear on the equipment and extra consumption of fuel.

IN this article the author describes some of the more elaborate tools in use in the shops of the German State Railways at Gottingen.

The taking of measurements as previously carried out was not only inaccurate but, due to the methods used, consumed a great deal of time. In view of this fact, the testing station engineers have designed a special machine which combines in itself the processes of measurement and machining, and thus excludes to a great extent the sources of error. The machine is equally adaptable for original construction or repair work, being primarily intended to make possible the machining of the longitudinal and transverse faces of the fixed journal box guides and wedges so that they are parallel to one another and also so that they will lie at right angles and at the correct intervals.

In order to eliminate further sources of error due to faulty machining of the journal boxes and of the journals themselves, the journal bearings are also bored after assembly. Only by such means is it possible to construct a journal-box

Fig. 1—This machine is used to align the locomotive frame parts and then machine them to perfect alignment with each other. At the right is one of the carriages. The measuring head with its telescope can be seen on the top of the carriage. The base of transverse measurement is the axis of the cylinder. Crossed hairs in the telescope aid in locating the "zero point" on this axis.

accurately to present-day specifications and to avoid expensive and slow fitting operations which, in the long run, do not prove satisfactory. Experience has shown that it is extremely difficult to mount cylinders with their axes parallel to each other and to the axis of the pedestal, and further, parallel setting is lost after the locomotive has been put into service.

The machine proper consists of two machine beds, 46 feet long, mounted on adjustable wedges on either side of the pedestal, upon which are mounted two carriages, one of which can be seen in Fig. 1. Each carriage consists of a heavy column carrying a cross slide, upon which is mounted a head carrying two grinding wheel spindles for grinding the transverse journal-box guide faces, a grinding spindle and wheel for grinding the longitudinal journal-box guide faces, and a spindle for carrying a tool to drill the journal bearings or for preliminary milling of the journal-box guides, as the case may be. A measuring head also moves on the horizontal slide, but it should be noted that the measuring head is in no way dependent upon, or affected by, any part of the machine that is subject to wear.

In order to align the pedestal properly, it is mounted on supports as shown in Fig. 2. The supports are built strong enough to carry the entire weight of the pedestal and boiler, although it is immaterial whether the pedestal is mounted with or without the boiler when the measurements are taken.

A device has been built into the machine by which the position of the cylinder axes in relation to the pedestal axis is corrected, so that during original construction the tiresome fitting of cylinders is eliminated and during repairs the cylinders can always be brought into a position exactly parallel to the pedestal axis. A machine of this description has already been in use for two years in the German State Railways Repair Shop at Brandenburg, and has produced excellent results. The machine combines in itself the operations of measuring and machining. The journal-box pedestal having once been correctly placed in position on the machine, all journal-box guide faces

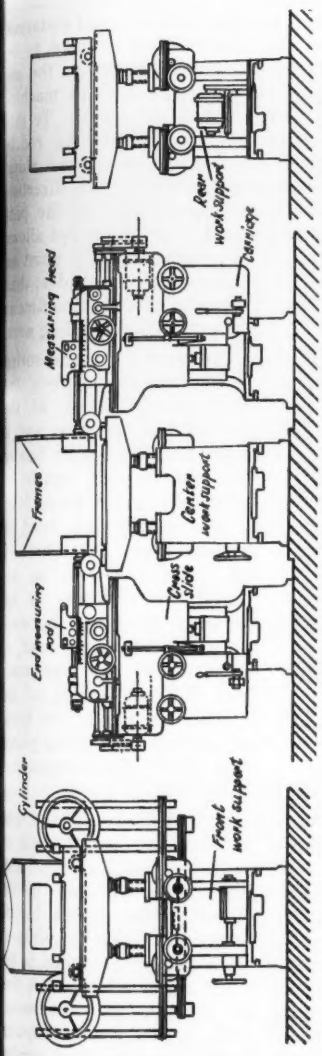


Fig. 2—A sectional view of the pedestal supports, processing units, and the measuring rods. The locomotive pivots on the center support and slides upon the other while being aligned with the aid of the telescopes.

journal bearings, and cylinder boxes are machined in parallel and at right angles to the longitudinal axis of the pedestal, in a single operation. The use of the machine enables the most accurate measurement and machining of the pedestal to be carried out with a comparatively small amount of labor.

The other measuring and machining parts are so interlocked in their functions that both machining and measuring operations can be carried out in rapid sequence, and to a large extent simultaneously. The measurements are made by the use of optical instruments which are accurate to within 1/10 mm., instead of with the usual rules and scales, centering-wires, and T-squares. The faces of the journal-box guides and the wedges, as well as the journal bearings, are machined in the assembled condition, thus reducing the opportunity for error.

In addition to the above-mentioned work, the machine makes possible a correction of the cylinder axis whereby the expensive hit-and-miss method of mounting the cylinders, as well as inaccuracies in the fit of the cylinders, are eliminated. All work is completed without a working-pit, pedestal repair work being usually done in a department set aside for this purpose. The measuring and machining of the journal-box guides in a triple-coupled locomotive require about eight working hours, as against about 120 working hours when ordinary methods are used.

As already mentioned, the pedestal must be accurately positioned in relation to the machine bed in order to ensure that it will automatically and accurately be machined without need for further measuring. For this purpose two aligning telescopes are provided, mounted on special supports on both sides of the pedestal, with their axes parallel to the machine bed. Further, two auxiliary telescopes are mounted in the axes of the cylinders, as shown in Fig. 3. The axes of the telescopes are aligned by a slight rotation of the pedestal, or, if the cylinders are not correctly positioned, the cylinder axis is adjusted to the pedestal. When this has been

done, the pedestal is correctly adjusted on the machine-bed.

The pedestal clamping device for the correct adjustment of the tool carriages includes an optical and measuring rod, which is placed in contact with the packing surface of the cylinder, thus making this the starting-point for taking the measurements. Any necessary correction for unequal distance between the center of the cylinder and the packing surfaces can be made. The extent of the longitudinal movement of the carriage up to the axis of the driving axle, and from there to the plungers, is indicated by an end measuring rod which is placed on the carriage slide ways and contacted with a dial indicator that is attached to the carriage, or it may be read directly from a scale fixed to the side of the machine, using the telescope on the measuring head. In order to facilitate readings, recurring measuring-points can be marked on the scale.

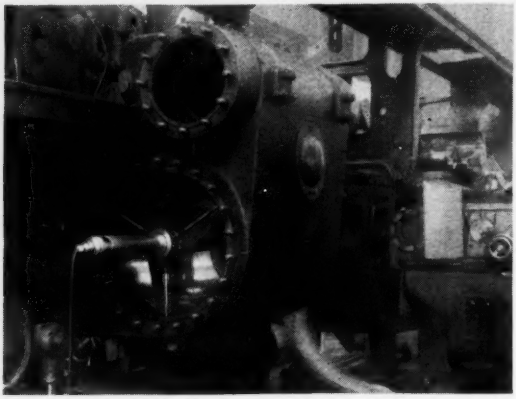


Fig. 3—Close view of the front clamping support and the cylinder spider with its telescope. All measurements and angles are taken from the axis of the cylinder.

In the event of the center line of the carriage, or of the measuring head, as the case may be, coinciding with the center line of the axle, there still remain the two unequal distances up to the journal-box guides to be measured in order to obtain the required measurements for the machining of the journal box itself. To this end an optical end measuring rod is supplied which can be moved along the measuring head in the direction of the longitudinal axis of the pedestal. This end measuring rod allows readings to be taken at any point on the journal-box guides; thus it serves at the same time as a check on the grinding work.

The device for measuring the distance between the longitudinal faces of the journal-box guides and the projection or center line of the cylinder axis consists of an auxiliary telescope fitted to the measuring head of the carriage. The axis of the telescope can be adjusted in relation to the aligning telescope by moving the measuring head. A scale on the carriage measures the movement of the measuring head, the fixed measuring face being placed against the longitudinal face of the journal-box guide.

Accurate adjustment of the tool carriages is obtained by the use of the telescopes in conjunction with crossed spider-lines (hairs) in the measuring head. The device for locating the carriage slide consists of an auxiliary telescope attached to the slide, the latter being adjusted so that the axis of the auxiliary telescope coincides with that of the aligning telescope so that an axial and parallel position of the slide is assured.

For correcting the axes of the cylinders, a hollow shaft carrying the wheel and spindle for grinding the cylinder packing surfaces (ends) is mounted on a pivot and can thus be adjusted in any direction. An aux

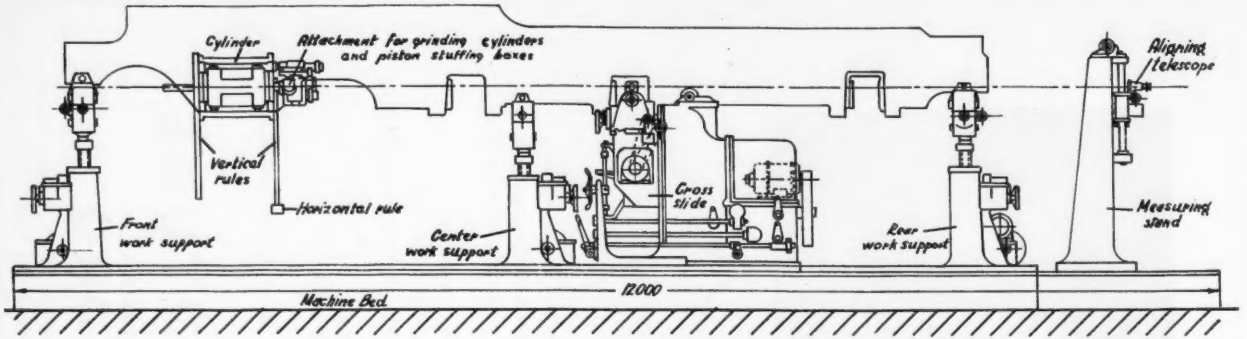
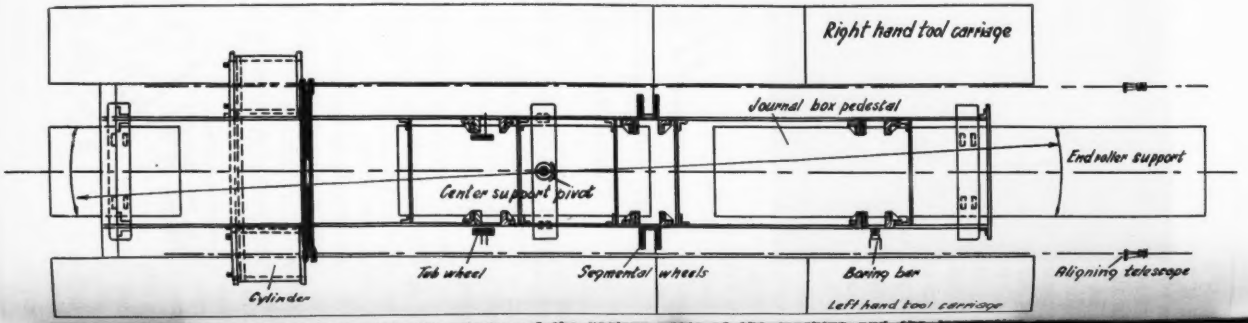
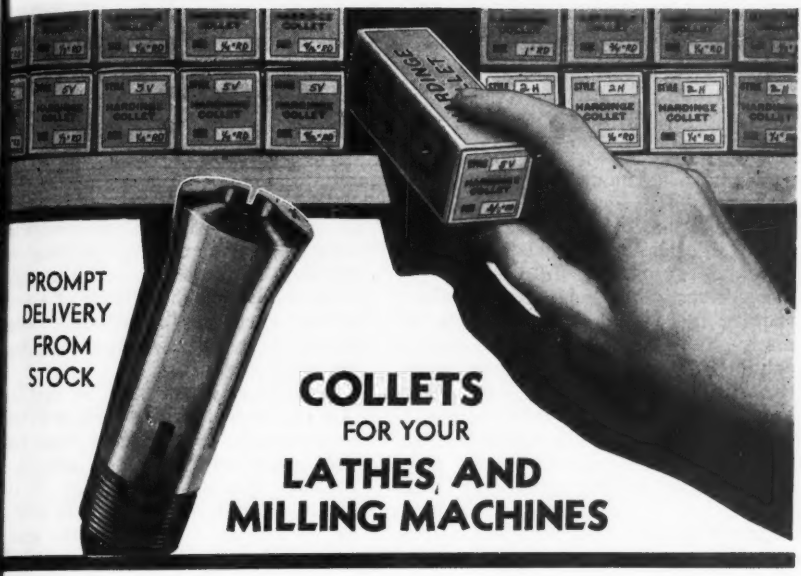


Fig. 4—Side elevation diagram showing the general arrangement of the machine. The frames must be raised to the level of the telescopes on the tool carriages, which are non-adjustable vertically. Horizontally they must be aligned with the telescopes in the cylinders, which are non-adjustable horizontally.





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iliary telescope is mounted in its interior. The auxiliary telescope is used to align the cylinder with the aligning telescope, then the packing surfaces are ground parallel to one another and at right angles to the axis of the pedestal. A cylinder-boring apparatus mounted on the shaft is then used to bore the cylinder.

The device for clamping the pedestal in position consists of two clamping supports. In the case of locomotives, the pedestals of which require more than two supports, as many clamping supports as desired can be used. These supports, which can be shifted on the bed-ways, have cross-ties floating on two vertically-adjustable spindles for horizontal adjustment. One more cross-tie rests across each of the cross-ties mentioned, of which the center or front support, as the case may be, can be swung around a pivot in its center so that its sides rest against rollers. The cross-tie of the other support rests on rollers only, which are fr to move on the periphery of a circ which has as its center the pivot the center cross-tie. Thus the clam ing support allows the pedestal to adjusted in all directions.

The apparatus for grinding the c inders consists of a centering dev which clamps to the end of the c inder, a shaft extending through centering device and carrying grinding equipment, and the equi ment itself, which consists of a sm motor carrying a grinding whe mounted on an arm projecting fr the central shaft.

In conclusion it may be said th this equipment, which weighs 56 to is naturally more costly than po able equipment. On the other ha greatly increased efficiency in c struction and repair work is attain by its use as a result of the great increased accuracy obtained in work and the saving in the amount time required.

HARDINGE COLLET CATALOG No. 35A: Forty-five years of experience are represented in the manufacture of the collets shown in Catalog No. 35A, now being issued by Hardinge Brothers, Inc., Elmira, N. Y. The book shows the styles of collets regularly adapted in the various makes of lathes and milling machines made in the United States, and is claimed to be the most complete list of its kind. The several styles of collets are listed together with the round, hexagon, and square capacities of each, and the general dimensions are given for the benefit of engineering, purchasing, and tool departments. A copy of the catalog is available to any mechanical executive or engineer upon request.

NEW DEPARTURE BALL BEARINGS: DIMENSIONS, LOAD DATA, AND LIST PRICES: This 5½ x 8½-inch book contains 144 pages of descriptions and illustrations of the various types and kinds of bearings made by the New Departure Mfg. Co., Bristol, Conn. In addition to the discussions of Design and Load Characteristics and descriptions of Typical Mountings, tables giving the principal dimensions and radial load ratings are given for each different type.

The list includes Single Row Rad Bearings, Double Row Bearings, "Radi Bearings, "Difrax" Bearings, Extra La Bearings, Magneto Bearings, Extra Sm Bearings, Clutch Throwout Bearin Snap Ring Bearings, Shielded Bearin Conveyor Roll Bearings, N-D-Seal Be ings, Front Wheel Bearings, and R Wheel Bearings.

Instructions are given for aid in t selection of bearings, and tables of A. E. Standard Bearing Tolerances a Mounting Fits are included. The lat part of the book is devoted to stand locknuts and lock washers, felts, wa ers, and springs, felt seals, and tab of bearing weights.

A copy of the book is available wi out charge to any mechanical engin or executive who asks for Booklet on his firm letterhead.

Your August copy of MODER MACHINE SHOP will be your gu to The Machine Tool Show, to be h in Cleveland, September 11-21. will not be placed in the mails u August 20. Be sure to save it.

Hard-Facing Valve Seats At the White Motor Plant

By Fred B. Jacobs

BECAUSE of the recent widespread adoption of hard-faced exhaust valve seat inserts by manufacturers of heavy duty trucks and buses the indications are that this type of design will soon be standard in passenger cars, Diesel engines, and, in fact, in all types of internal combustion engines. Numerous reports show that hard-faced seats last from 10 to 20 times longer between valve grinds than ordinary cast iron seats, resulting in lower gasoline consumption, lower compression losses and increased power, mileage and all around motor efficiency.

Only during the past few years has much attention been given to the valve seat problem, cast iron seats machined directly into the cylinder block or cylinder head having been standard since the first use of the poppet type valve in automobile engines thirty-five or forty years ago. However, with the development of better engineering materials to fit specific conditions, and more advanced engineering principles, the ordinary cast iron seat has recently given way to a group of specialized materials covering a wide range of hardness and abrasion resistance. These materia include alloy cast iron, alloy ste high-speed and Haynes Stellite.

Cast iron seats have always cau more or less trouble especially heavy duty equipment where they quire constant servicing because burning, pitting and pounding. T fact that modern engines materia increase the duty on the valves a seats as compared with loads of few years ago has accentuated t problem. Higher compression rati faster speeds and more constant ru ning at full load have resulted shortening the life of the usual c iron seat to point where its operati is no longer in keeping with the ide of modern engine efficiency.

The exhaust valve seat is subjec to both high temperatures and stress and at these temperatures the carb is presumably burned out of the ir forming a deposit of fine, flaky pa ticles on the valve and seat. To th is added the carbon formed by t combustion of the gases in the cyl der. These carbon particles adheri to the valve and seat tend to gri down and wear away the seat and t effect is increased by the natur pounding of the valve on the se As the valve seat wears and the va sinks deeper into the block, the cle ance between the valve stem and tappet is diminished. If this clearan should be completly taken up, a "bl by" of the gases occurs. Not o does the engine lose compression the valve erodes rapidly. To prev this from happening, frequent a annoying valve adjustments are n essary. Also, when the valve st sticks, the hot burning gas "wi draws" through the slight open between the valve and its seat ca ing rapid erosion.

These facts indicate the use o seating material more resistant abrasion, corrosion and erosion high temperatures than the cylin

or head casting. Briefly, the requirements, then, for the seating material are:

1. It should retain its strength and hardness at elevated temperatures.
2. It should resist abrasion, erosion and corrosion.
3. It should be smooth, have a low

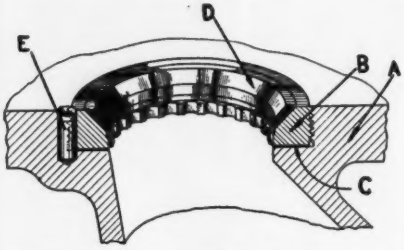


Fig. 1—Construction Details of Hard-Faced Valve Seat.

coefficient of friction, and resist the formation of deposits on its surface.

Additional requirements affection problems of design are:

4. It should have approximately the same coefficient of expansion as the cylinder block material.
5. It should be easily installed and serviced.

Haynes Stellite, a non-ferrous alloy of cobalt, chromium and tungsten has been found to fit these requirements admirably. Inherently hard, this alloy retains its hardness through the red heat range, and at temperatures above 1100 deg. F., is harder than any other known alloy, except those of the tungsten carbide class. It is one of the most abrasion-resistant materials known to industry and is so smooth and takes such a high polish that it is often used as a burnishing tool. Its coefficient of friction is low, one-third lower than that of steel, and its thermal expansion agrees well with that of steel up to 1290 deg. F. In the form of welding rod, the alloy is easily and quickly applied by the oxy-acetylene blowpipe and welded deposits are easily ground by means of recently developed precision grinding equipment.

A number of larger truck and bus companies, among which is the White Motor Company, have standardized on Haynes Stellited valve seats and have kept accurate performance records. These companies have found that after runs of 100,000 to 150,000 miles under full load, no regrinding or refinishing of the valve seats is necessary. Even after these long runs the seating surfaces are in as good condition as when installed. Moreover, the alloy steel valves also last longer when working against a Haynes Stellited seating surface. One midwestern fleet owner reports he is now getting 150,000 to 200,000 miles from steel valves that are operating on Stellited seats, whereas formerly the best he could obtain with steel valves on cast iron was about 6,000 miles' service.

There are two usual methods of installing Haynes Stellite valve seats. One consists in holding the inserts

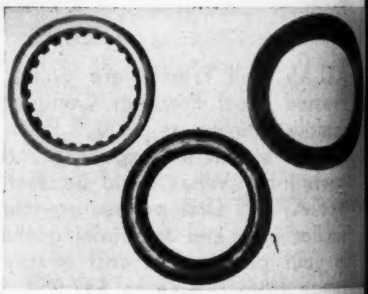


Fig. 2—(a) Valve Seat Insert. (b) Insert with Stellite Seat Welded in Place. (3) Finished Valve Seat.

seat in place by means of a shrink or press fit. The second method which is used at the White Motor plant, is to screw the seat into the counterbore of the block.

The construction details of this seat are clearly shown in the illustra-

tion Fig. 1, wherein the cylinder block is indicated at A, the steel valve seat at B, the soft metal washer against the seat is screwed in place at C, the Stellite seat welded in place at D, and the locking screw at E.

The seat consists of a threaded machine steel ring having a beveled seating surface upon which is deposited a layer of Stellite by means of the oxy-acetylene process. Referring to Fig. 2, the part at the left is the steel valve insert, the upper view shows the insert with the Stellite seat

Fig. 3—Welder hard-facing a valve seat for a White motor by applying Haynes Stellite.

welded in place, and at the right is shown a finished valve seat.

The welding process is shown in Fig. 3. The valve seat is placed on a rotating holder, the rotating movement being actuated by a fractional horsepower motor driving through a speed reducer. The operator controls the rotation of the valve by means of a foot treadle which operates as a rheostat, speed from practically nothing to approximately 30 revolutions per minute being available. However, the average practical speed is about one revolution of the work in a half-minute.

After the seats have been welded they are rough-ground, threaded on the outside, and screwed into the block. Then the hard-faced seating surface is finished with a high speed grinding wheel, held so that the seat is of the correct angle, concentric and absolutely square with the valve seat base. The locking screw is used to lock the seat to the counterbore. Once in place, it should never be necessary to remove the hard-faced seats as they are practically indestructible and should outlast the rest of the motor.

ANACONDA WELDING RODS: This sixteen-page book contains a fund of valuable information for every user of welding equipment or supervisor of a department in which welding operations are carried on. The book tells why bronze and other copper alloys have found widespread favor as welding rods and gives a clear description of the methods of procedure when Tobin bronze and other Anaconda copper alloys are used in welding.

The particular application for which each type of rod is best suited is described in detail and instructions are given for the use of the different rods. A chapter is devoted to the preparation and method used in bronze welding and a number of illustrations are given showing the results that have been obtained by the use of such rods.

In a chapter titled "Methods of Welding", detailed instructions are given for handling the Oxy-Acetylene Gas Torch when Tobin bronze, manganese bronze, brazine metal, naval brass, nickel, silver or ambrac are used. Another section discusses the practice to follow with Everdur, phosphor bronze E, deoxidized copper and silicon copper. Still another section gives directions for the use of electric carbon arc and metal arc with the same metals.

A copy of this book is available to any mechanical executive upon request.

"CP" POWER VANE ROTARY TOOLS: This sixteen-page catalog contains descriptions, specifications, and illustrations in color of the various units comprising the "CP" power vane rotary drills made by the Chicago Pneumatic Tool Company, 6 E. 44th St., New York, N. Y. Of particular interest is a two-page cross section drawing showing the operating mechanism and construction of a power vane tool. Copies of the catalog are available to mechanical executives upon request.

Punch Press Operations and Tools, X

Hand-indexed dies have a definite place in the production o stampings. In this article the author discusses the design an construction of these dies.

By C. L. Szalanczy,
Tool and Equipment Department, Westinghouse Electric & Mfg. Co.

Among the more frequent types of work produced by the stamping method is the round blank in which a number of holes or slots are perforated. Hand-indexed dies are used extensively in the production of such blanks, the dies being made with either a single hole or slot or so that the die will complete the punching of a group of two or three holes at the same time, the holes being located on either the same or different diameters.

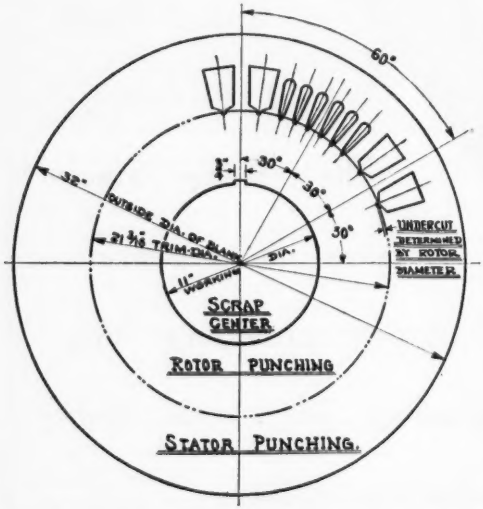


Fig. 1—Complete stator-rotor blank before being separated. The slots are shown in the stator punching.

A substantial saving in tool cos may be made by employing this typ of tool since otherwise it would mea constructing a large die containin the entire set of punches fo piercing all the slots or holes i a single operation. While th latter method is quicker, th original cost of the tool is muc higher and if the number o punchings required is limite the expenditure for such a di would not be justified.

Hand-indexed dies may b used on any standard single-ac tion punch press that has a open frame. Very accurate wor can be produced with such a di if care is exercised in maintain ing the accuracy of the locatin finger and the index ring. Sinc there may be any number o jobs going through the plant i which the same number of hole or slots may be required, al though the apertures may no be of the same shape, the han index may be made as an in dividual mechanism and not a an integral part of the die. Thus th index can be used on any job of thi type. Of course, this procedure wil in time cause wear on both the locat ing finger and the notches in the inde

ring, but these parts should be carefully inspected from time to time and kept in repair so that the ring will always locate itself correctly and thus assure a perfectly spaced punching.

A round sheet steel blank is illustrated in Fig. 1. The usual method of producing these large round punchings is to use separate standard round hole dies for blanking out both the inside and the outside of the punching. In the following operation the single keyway is punched in and the blank is then located from this keyway on the index ring. The scrap or center part is usually kept to be used up in making smaller punchings. To complete this stator punching, two separate slot dies are used each having its own index plate but both using the same indexing assembly.

It will be noted that on this blank the winding slots are punched in series of two large slots and six small slots alternately around the entire blank. The inside or working diameter is punched to 11¼-in. dia. while the finished dimension of the blank center is 21.187-in. dia. After the slots are all punched, the blank is trimmed by a 21.187-in. dia. trimming die which completes the blank. The remaining part is then usually used to produce the rotor punching.

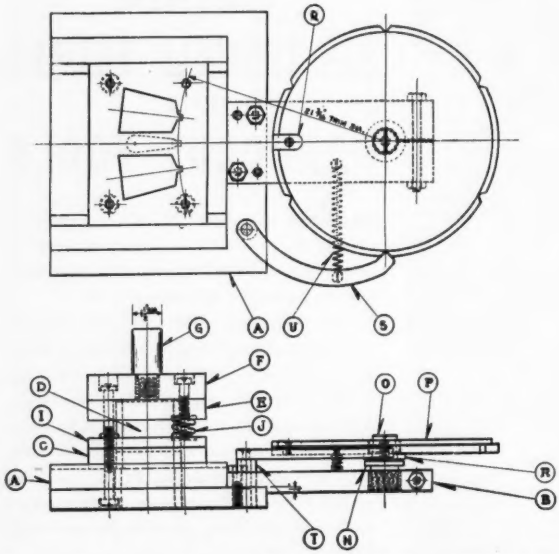


Fig 2—Illustrating the complete assembly of the double slot die and the indexing attachment used in conjunction with it, bolted in place on the die shoe.

Figure 2 illustrates the complete assembly of the double slot die and the indexing attachment bolted in place on the die shoe. A is the machine steel die shoe, machined to leave a holding ledge on the two sides and also a ledge in front, on which the index arm is bolted and doweled. The shoe A is undercut for letting in the die, C, which is held in place by four ⅝-16-thd. fillister head screws. Clearance holes are burned or machined into the die shoe to allow the scrap slug from both dies to fall through.

The die C is made from tool steel, shaped ground on the top and bottom and finished-machined, then hardened to 80-85 points scleroscope. It is best to make these dies about 1 in. high with ⅛ in. to 3/16 in. flat on the cutting edges before any taper is filed on to allow more clearance for scrap and also to ease up the work of the punch press. It has been found that, in cases where the taper has been omitted, more power is actually required to push the collected scrap through the die than it took originally to blank the piece

The die is made larger than the punch by the usual amount of clearance.

The punch **D** is made to size from tool steel and is hardened the same as the die with the exception of the upper part, which is left soft. The punch is usually ground to finish size, and is then press-fitted into the machine steel punch plate **E** and peened over. The entire top surface is then ground to assure a flat surface for contacting with the bottom of the punch holder **F**. The punch holder is made from 1¼-in. thick machine steel, slab ground on the top and bottom and provided with the necessary screw and dowel holes for holding the punch plate in position. It also has a 1½ in. or 2 in. dia. punch stem **G** screwed into it by which it is held in the ram of the press. It is to use the 1½ in. dia. stem as it be used in the smaller presses if required, a bushing such as shown at **H**, Fig 3, can be used adapt it to the larger-size press

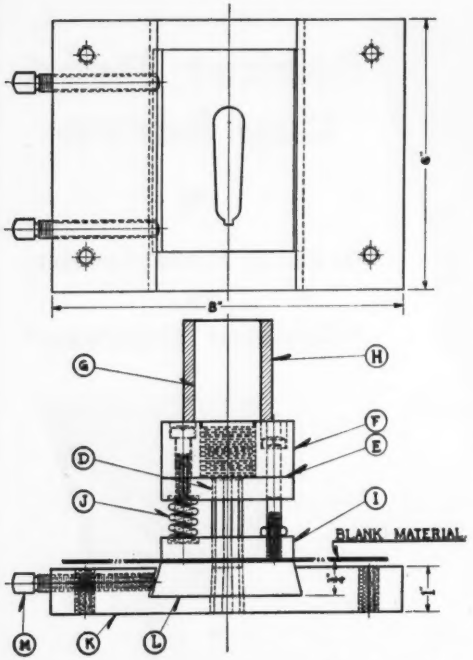


Fig. 3—This drawing shows the single slot die that punches the six smaller slots, one at a time, into the blank.

The stripper **I** is ½ in. thick ground machine steel stock held by means of four fillister head screws which move up down with the stripper, clearance being provided in punch holder for the These screws are provided nuts for adjusting and locking the stripper and the downward movement is actuated by eight compression springs **J**. stripper should be machined a slip fit around the punch It is employed primarily to the material being cut flat then to strip or push the blank back off the punches.

Figure 3 shows the single slot die that is also used on blank. The construction of die assembly is the same as one previously described with the exception that the machine steel die holder plate **K** machined to the same size as die **C**, so that when it is moved from the die shoe **A**, holder **K** can be inserted fastened in place. This has a groove cut through center from front to back the sides machined to a 15 gree angle. The single slot **L** is machined to the same angle after the die has been placed in tion, it is held in place with the set screws **M**.

Construction of the Indexing Mechanism

The 1 in. thick machine steel arm **B**, Fig. 2, is machined back to a depth of ¼ in. on the end

it is seated and fastened to the die shoe **A**. This arm is carefully laid out and is drilled and tapped to suit the index plug **N**. The arm has a ⅛-in. saw cut that runs into the tapped hole and has a 13/32-in. dia. clearance hole through the two parts. A ⅜-16-thd. machine screw goes through this hole and is used to permanently hold the index plug in its set position.

The index plug is made of high carbon tool steel and is threaded 12 threads per inch on the one end, the opposite end being turned to 10 degrees taper on a side. This is checked with a ring taper gauge to make certain the entire surface is perfect. The ¼-in. thick collar in the center has four openings for adjusting with a spanner wrench to the desired location. The index plug is case hardened to resist wear. A 7/16-thd. tap is run in 1½ in. deep on the tapered end to suit the special index screw **O**, which is used to fasten down the index ring or plate. The head of this screw is made about ¼ in. larger than the tapered end of the index plug and has a screw driver slot in it. This screw is made from cold rolled steel and is case hardened.

The index plate **P** is burned out to shape from ⅝-in. thick hot rolled sheet steel, allowing ¼ in. all around for machining. Following the burn-out operation the plate is annealed so as to relieve both the rolling and burning-out strains. It is then slab-ground on the top and bottom, laid out, and finish machined to drawing dimensions with the top part cut back to a depth of ¼ in. to form a ledge on which the blank rests while it is being indexed and perforated.

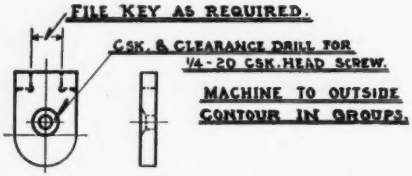


Fig. 4—Drawing illustrating the partly finished index keys as kept in stock.

The key opening is profiled in position and the required number notches are cut into the side. The key **Q** is made of high carbon steel shaped to size, case hardened, and anchored in place with a countersunk-head screw.

The index bushing **R** is made of bronze with a ¼-in. shoulder at the bottom in which two openings are machined so that adjustment can be made with a spanner wrench. 1⅝-12 P. thread is cut on the other end for screwing into the bottom of the index plate. The plate is adjusted by this bushing so that it stands a few thousandths of an inch under the index plug; then when the screw is tightened down the bushing keeps the plate from rising, yet will not bind its movement.

The index plugs, bushings and screws may be kept in stock in the store room as they are always the same and are interchangeable in case of repairs. It is also cheaper to make several at a time instead of one at a time as needed. The key may also be made in the manner shown in Fig. 4, partly finished and requiring only a small amount of bench work to complete them for use in production. They can be milled up in a group of 10 or 15 at a time and stored to be used as required.

The index finger **S** is made of cold rolled steel shaped to suit the job at hand. The indexing point should be case hardened to reduce wear. The cold rolled steel finger support **T** is press-fitted into the die shoe and the finger is held in place by a steel pin that is riveted over at the top of the finger and extends down into the support. The pin is ma

to a close slip fit in the suppo The indexing finger is pulled into t notches in the index plate by t expansion spring U, which is faste to the index arm with enough te sion on it to pull the finger back in indexing position.

In Fig. 5 an index plate V for single slot die is illustrated. The co struction is identically the same the one previously described with t exception that the notches are cut groups of six to suit the six slo

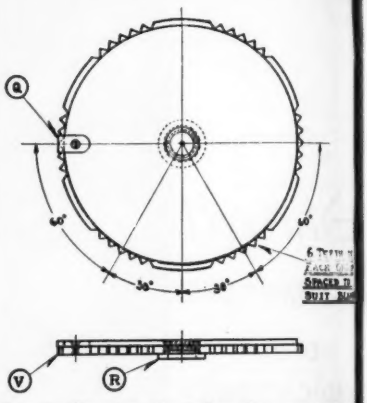


Fig. 5—Showing the index plate used with t single slot die illustrated in Fig. 3.

in the blank. The locating key a index bushing are in place as the are a permanent part of the plate.

The rotor slot dies are made in th same manner as the stator dies, eac having their own shoes and separat indexes to suit the blank dimension Quite often several slots or a grou of slots may be made on the sam shoe by enlarging the scrap hole but the fact should be kept in min that if large slots are being punche without adequate under-support to th die, breakage may result. The smal amount of saving that might hav been effected by using an existin die shoe in such a case would be fa offset by the cost of a new die.

IDEAS FROM READERS

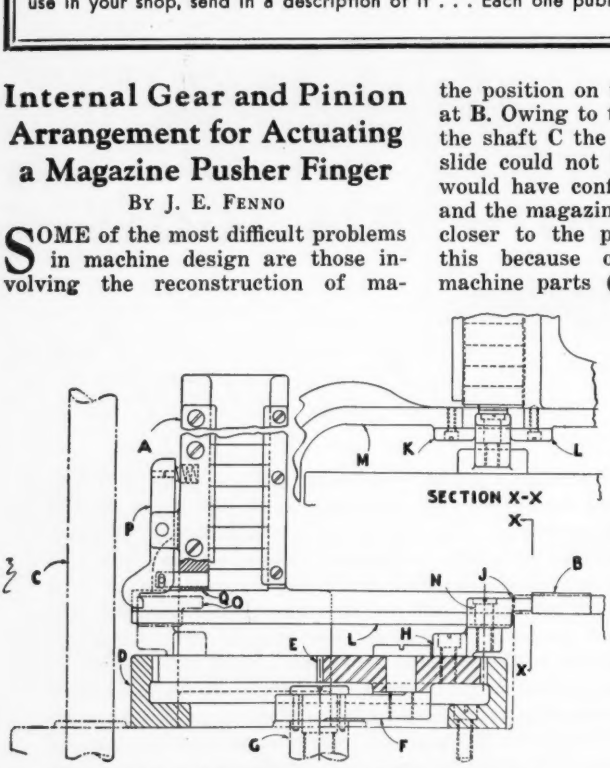
This department is a clearing house for ideas . . . If there is a "kink" or short cut in use in your shop, send in a description of it . . . Each one published will be paid for.

Internal Gear and Pinion Arrangement for Actuating a Magazine Pusher Finger

By J. E. Fenno

SOME of the most difficult problems in machine design are those involving the reconstruction of machines to adapt them to current changes in product specifications or to step up production. The latter requirement presented one difficulty in a certain packaging machine in that the old hand method of feeding was to be superseded by a magazine feed and the space for the feed slide was extremely limited.

Referring to the illustration, the part is fed from the magazine A to the position on the machine indicated at B. Owing to the close proximity of the shaft C the ordinary pusher feed slide could not be used here since it would have conflicted with the shaft and the magazine could not be located closer to the part B to accomplish this because of other obstructing machine parts (not shown). Another objection to the ordinary pusher slide was that the space under the slide was too limited to obtain a long slide movement in the usual manner.



Drawing of an internal gear and pinion arrangement for actuating a magazine pusher finger.

In the mechanism shown, the rectilineal movement of the slide is based on the geometrical proposition which states that a point on a circle rolling on the inside of another circle twice its diameter will reciprocate in a straight path, the movement in either direction being equal to the diameter of the larger circle. In the design shown, the outer circle corresponds to the stationary internal gear D and the inner circle to the pinion gear E pivoted to the end of arm F. This arm is secured by a screw and dowels to the end of the shaft G, which is a part of the machine as originally designed.

Upon a bracket H secured to gear

B is pivoted the pusher finger J which projects between the work supports K and L. Support K is secured to the bracket M which in turn is fastened to the side of the machine. Support L is fastened to the base of the magazine. With this arrangement, the bracket M and the base of the magazine form a guide to retain the work as it is fed by the finger J along the work supports to the machine. Incidentally the rear extension of the magazine base is fastened to the machine although this connection is not shown.

The pusher finger J is shown at the end of its stroke toward the right where it has deposited the part B in the machine. As shaft G continues to rotate, the gear E rolls around the gear D and since the center of stud N is in a position corresponding to the point on the circle mentioned in connection with the geometrical proposition, then the center of this stud will move toward the left in a straight line and carry the pusher finger back to the position indicated in dot and dash outline at O. In reaching this latter position, the heel of the finger pushes the lever P back and withdraws the pin Q which normally presses against the work and holds the column of parts from dropping when the bottom part is removed.

When the pressure on the work is released in this way, the column drops, the lower part resting on the supports K and L. As shaft G continues to rotate, the finger J reverses its movement and moves toward the right pushing the bottom part in the column with it. In doing so, the finger recedes from the lever P allowing the latter to return the pin against the succeeding part and hold the column in position. Continuing the movement of the finger toward the right, the moving part is carried to the position formerly occupied by

part B. This completes the cycle.

One of the advantages of this design is that the movement of the finger is accelerated at the beginning of the stroke and retarded at the end of the stroke thus assuring the smooth action which is so desirable when feeding work of a frail nature. Its compact design, when the relatively long stroke of the pusher finger is considered, is another feature which might suggest its use for similiar applications.

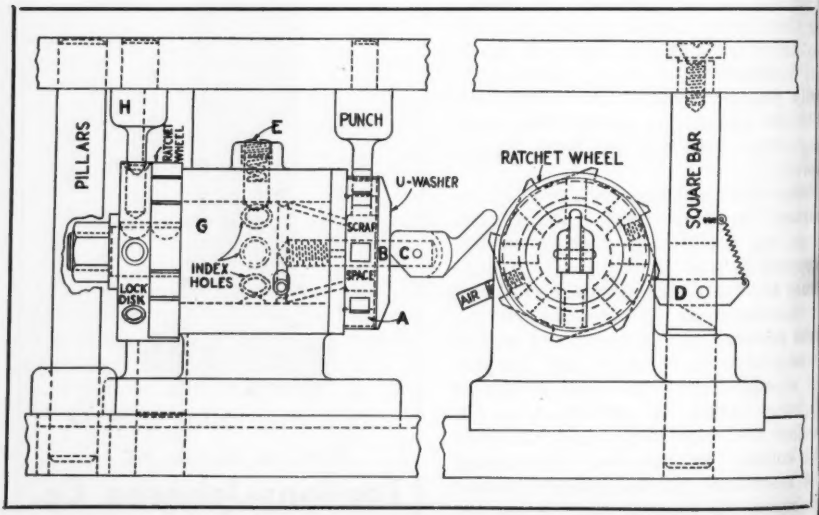
Automatic Indexing and Piercing Die

By Wm. C. Betz

IN punch press work, as in other work, the operation must be performed quickly and accurately. However, due to the nature of the equipment, the factor of safety is a more important consideration in punch press operation, than in most other work, consequently the type of die shown in the illustration should find many applications.

The die illustrated here was designed to index the work automatically, the indexing mechanism being actuated by the press mechanism. In operation, the work is slipped over the die ring A, the U-washer is slipped into position over the stud B, and cam C locks the work in position. The operator removes his hand from the die, trips and holds the treadle down until the press has made the necessary number of strokes, snaps the cam C to release the U-washer, removes the pierced workpiece and replaces it with another blank. Then the operation is repeated. From 400 to 600 pieces per hour may be pierced with one of these dies, depending upon the number of holes required in the work.

It will be seen that as the ratchet pawl D leaves the ratchet wheel slot, the primary lock, in the form of a ball and plunger actuated by a coil spring, indicated at E, slips into one



Drawing showing design of automatic indexing and piercing die for punching rectangular slots in sheet metal retainers for roller bearings.

of the index holes in the stud G to hold the stud in position. The ratchet wheel is operated by the pawl D, which works up and down as the ram of the press ascends or descends.

It will be noted that the pawl has a coil spring at the rear which pulls it down onto its seat in the bar. When the pawl contacts the ratchet wheel, on its downward stroke, it throws the pawl up, allowing it to slip past the wheel. As the pawl clears the wheel, the spring pulls it back into position to engage one of the teeth on the ratchet wheel in the following index stroke.

As the press ram nears the top of its stroke, the ratchet disengages the tooth in the wheel. The exact time that the pawl leaves the ratchet wheel tooth must be determined and the pawl ground to the correct length to take care of this timing so that the auxiliary index plunger E may enter one of the holes in the stud G.

On the downward stroke of the press, the positive lock pin H enters one of the holes in the lock disk and thus locks the stud G against rotation while the piercing punch does its work. The lock pin H must be of such length, however, that it does not interfere with the operation of the ratchet wheel on the upward stroke of the pawl bar. To do this the pawl should be allowed considerable clearance at the bottom of the ram stroke, below the ratchet tooth that it is to engage.

The pierced slugs drop into the space around the stud and may either be scooped out or blown out by a jet of air from a hand or foot valve, located at the left of the fixture. To fit the die for air, an air connection is screwed into the shaft casting in line with a groove in the bore of the stud G. Either six or eight holes are drilled into the periphery of the stud to meet the groove in the bore.

In making the die ring A, slots are machined in the periphery as required. When the work edges become dull, the ring is discarded and a new one is made because the ring would be undersize if it were reground and an undersize ring would distort the work and allow inaccuracies in the indexing. The ring is attached to the index stud G by the use of headless setscrews, as shown.

This fixture can be used on any job where accurate indexing is necessary. Holes of any shape may be pierced, to any size within the capacity of the fixture. The fixture shown was designed to pierce rectangular slots in sheet metal retainers of various sizes for roller bearings.

U-Bolt Bending Fixture

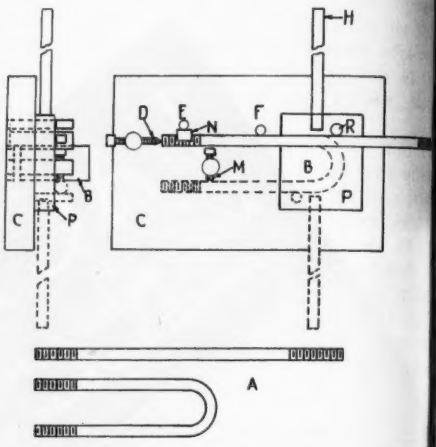
By Charles Kugler

AMONG the jobs alloted to the writer was one which consisted of designing and making a cheap fixture with which to bend a small lot of U-bolts. The result was the fixture shown in the drawing. The entire fixture was made from available material, mostly scrap, and the only machine used was a drill press and a power hacksaw.

It is evident that the only part that had to be made to a definite size was the form which determined the dimension of the opening in the U-bolt, indicated at B on the drawing. This part is 1 inch in diameter, and consists simply of a section of 1-inch round stock pressed into a hole of corresponding size in the plate C.

After cutting the blanks to length and threading them, as shown at A, each blank in turn was placed in the fixture in contact with the stops D, E and F. To prevent damaging the threads as result of the tension set up during the bending operation, a nut was cut in half and placed as shown at N. The pins E and F are set into the base, as shown.

The pin R is set into a plate, P, which revolves about the round section B when moved by means of the handle H. An adjustable stop M is provided to limit the movement of the handle H at the end of the stroke. To operate, the section of stock is placed in position against the stops D, E, F, and R, then the handle is pulled around until the stock strikes the stop M. The dotted lines show the position of the handle and U-bolt after the bending operation has been completed.



Design of U-Bolt Bending Fixture.

An Adjustable Boring Too

By J. A. Honegger.

A COMBINATION boring bar and sweep tool of simple construction, in which the disadvantage of an eccentric load or dynamic unbalance is practically eliminated, is shown in the accompanying illustration. Bars of this type can be run at a muc

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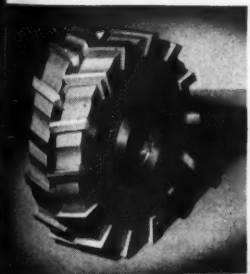
(Above) Ingersoll Zee-Lock Half Side Milling Cutters for Side or Straddle Milling.

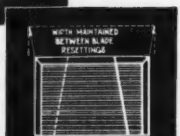
(Center) Ingersoll Zee-Lock Staggered Tooth Cutters for Slotting, Keyways, or Channeling.

(Extreme Right) Ingersoll Plain Side Milling Cutters for Accurate Slotting.

(Below) Ingersoll Interlocking Milling Cutters for Side Slotting or Channeling.



Ingersoll Zee-Lock Staggered Tooth Cutters may readily be reset for width, as the alternate Zee-Lock Cutter Blades move axially and positively when adjusted outward one serration.



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higher speed with less hammer on the spindle and spindle bearings of a machine, which in turn will give a much smoother cut.

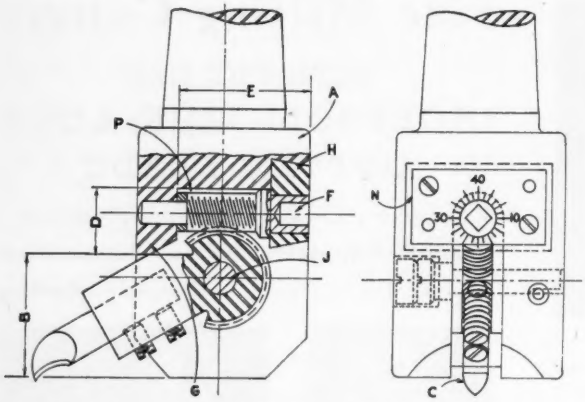

Fig. 1—Drawing showing adjustment mechanism of boring tool.

The tool consists of a high carbon steel holder A, Fig. 1, in which a side milling cutter has been sunk to the depth B leaving a rectangular through slot C. For the additional depth D, an end mill is sunk into the holder to the depth E, which thus forms the pocket for the adjusting screw F. Corner G is then milled away for clearance, after which the dovetail slot H is cross-milled.

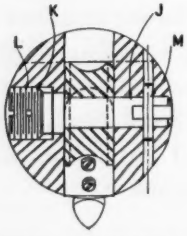

Fig. 2—Drawing illustrating method of applying tension to the tool holder.

The segmental worm wheel and tool holder is next made up and is a very snug fit in holder A. This holder pivots upon the pin J shown in Fig. 2. The pin is so constructed that the head of it presses upon the tool holder, by which means the holder is prevented from riding free in the slot. The amount of pressure that is applied to the pin is adjusted by set screw K and is then locked in position by means of the lock screw L. To prevent pin J from rotating, the cross pin M is inserted, riding against a fiat that has been milled or ground on one side of the end of the pin J.

Referring again to Fig. 1, the dovetail insert N is next fitted into

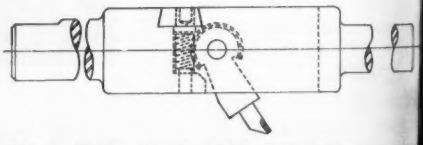

Fig. 3—Boring bar in which segmental worm wheel and tool holder is used.

the holder A. When this has been properly fitted, adjusting screw F is screwed in. The thrust washer P is machined so that all endplay of screw F is eliminated. On the outside face of the dovetail piece N graduations are inscribed. These graduations represent parts of a revolution of the screw F and are not any definite measure of tool adjustment.

This construction is also adaptable for use with a stationary boring bar for lathe operations. Such a construction is shown in Fig. 3. The writer employed this construction recently

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with some very satisfactory results. It should further be noticed that if a suitable key is inserted in the square hole of screw F certain internal spherical surfaces may be machined by rotating the screw F.

TREATISE ON THE DRESSING AND TRUING OF GRINDING WHEELS. This booklet, issued by The Carborundum Company, Niagara Falls, N. Y., contains 46 pages of useful, practical information concerning the best methods and tools to use in dressing and truing grinding wheels of all kinds and types. The text contains descriptions and illustrations of different kinds of dressers, and gives the specific purpose for which each should be used. Directions are given for feeds of dressers for the production of different kinds of surfaces.

Among other subjects covered are these: Industrial Diamonds; Diamond Characteristics; Diamond Sizes; Care of diamonds; Mendes D-P Diamond Dressers; "Staset" Diamond Dressers; Carboloy Truing and Dressing Tools; Koebel "Multi" Diamond Dresser; Industrial Diamond Co. dressing tool; Truco Dressing Tool; Central Tool Co. dressing tool; General Rules for Application of Diamond Tools; Effects of Coolants on Dressing; Truing Wheels to Precision Radii, and many more.

The book is well illustrated with photographs and drawings. A copy will be sent to any mechanical executive who requests it on his firm letterhead.

LANDIS INTERNAL AND EXTERNAL HYDRAULIC RACE GRINDERS are discussed in detail in Catalog No. G-94, which has been released by Landis Tool Company, Waynesboro, Pa. These machines are designed espcially for the grinding of internal and external ball races, and are designed to provide many mechanical refinements that make them applicable for the task for which they are intended. The refinements are illustrated and described in detail in this book. Copies free to plant executives.

Your August copy of MODERN MACHINE SHOP will be your guide to the Machine Tool Show, to be held in Cleveland Sept. 11-21. It will not be placed in the mails until August 20.

Over the Editor's Desk

AT a recent meeting of the American Society of Mechanical Engineers, Mr. George Seyler, Works Manager for the Lunkenheimer Company and Chairman of the Society's Committee on Education and Training, gave a report on the labor situation which indicates that the shortage in skilled mechanics will be serious if the industrial situation returns to normal. The shortage may amount to 100,000 workers, according to Mr. Seyler.

Quoting from a report of the National Industrial Conference Board, Mr. Seyler gave figures which indicate that, with millions of workers still unemployed, the need for trained mechanics is on the verge of being acute. Among the 287 manufacturers who replied to the questionnaire sent out by the Conference Board are many who even now are having considerable difficulty in finding skilled workers, and there is no question but that the situation will become more critical as business improves.

Some of these manufacturers are put to the necessity of interviewing scores of applicants in order to find a few men who have had sufficient experience and training to make them competent to operate the more complicated machines, or to be trusted with maintenance or tool work. All-round machinists or mechanics trained to operate the more important machine tools are at a premium,, and in some cases extensive advertising for such workers has failed to provide enough mechanics to fill the need.

There is a reason for this situation, of course. In addition to the number of skilled men who annually pass from the metal trades field due to natural causes, during these past five years thousands of trained mechanics have drifted into other fields and cannot be counted upon to return. The advantages of prestige and higher wages usually enjoyed by the trained worker have lost their importance in the face of steady jobs at perhaps less desirable work and lower wages. Some of these men who might have continued at their trade until retired by age have put their savings into small businesses of one kind or another which may entail harder work at long hours, but which offer security from periodical layoffs. These men will not come back again.

Another reason for the shortage, according to the report of the Conference Board, is the restriction on immigration. The thousands of skilled mechanics who formerly crossed our borders annually have dwindled to a small percentage of the former number, and the fact is that for the past several years the number of foreign-born who have been leaving this country each year is greater than the number of those who entered.

It is evident that the metal trades is going to feel the lack of skilled labor until a new crop of mechanics and artisans can be trained. It is practically a hopeless matter to try to bring any of them back into industry with the lure of high wages, and attempting to fill the individual manufacturer's needs by drawing men from other plants through competition in the matter of wages is poor business, looking at it from any angle.

The best way to obtain trained men is to train them, and the best time to institute the training program is right now. An apprentice training system is not difficult to introduce and maintain, and full information on the subject is available from a number of sources.

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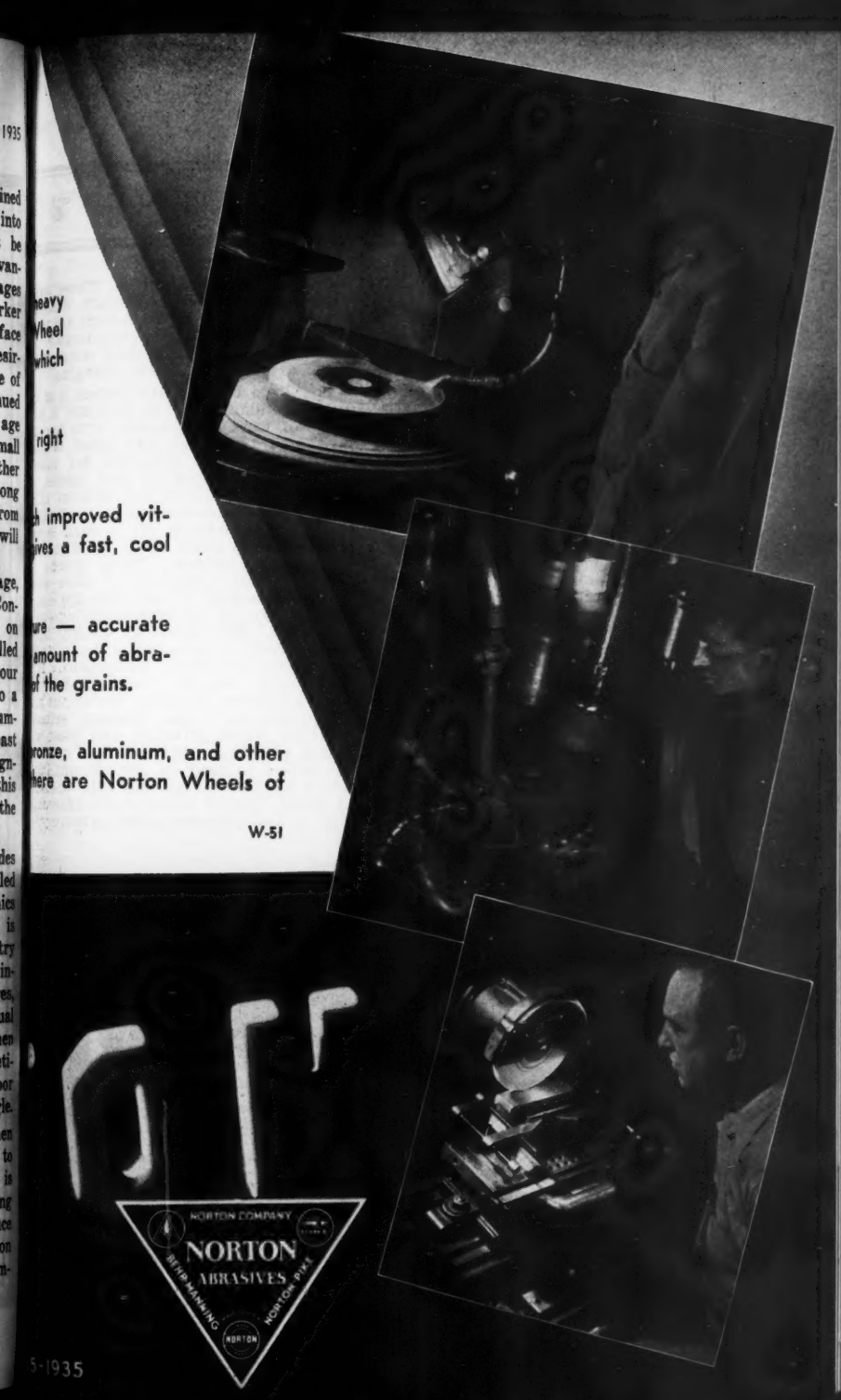


5-1935

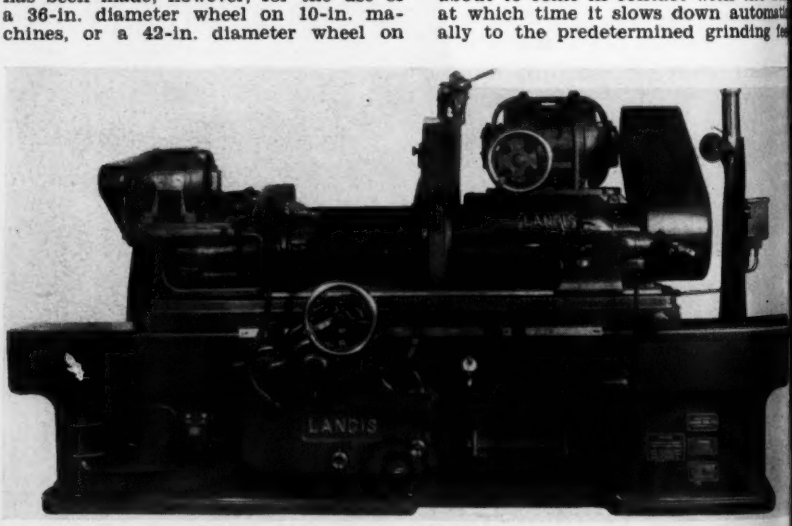
NEW SHOP EQUIPMENT

Landis Type D Plain Hydraulic Grinding Machines

The 10-inch, 14-inch, and 16-inch Type D Plain Hydraulic Grinders now being built by Landis Tool Company, Waynesboro, Pa., are modern high production machines in which are embodied many new features of design. The 10 and 14-in. sizes may be used for the grinding of spindles and shafts of many types and sizes. The 16-in. sizes may be used instead of the 10 and 14-in. sizes for the grinding of many of the foregoing parts which might require a machine of greater swing. Small straight faced rolls may be ground to advantage. Because of the weight, size, and power of the machines, they may be used for wide wheel and multiple wheel grinding.

The end wheel spindle drive is thru multiple V belts. Flood lubricated cap-type babbitt-lined steel wheel spindle bearings are used. This feature makes possible the utilization of less wheel spindle clearance than is ordinarily required. As a consequence, better finish is secured. A 30-in. diameter grinding wheel is considered standard. Provision has been made, however, for the use of a 36-in. diameter wheel on 10-in. machines, or a 42-in. diameter wheel on 14-in. and 16-in. machines. These la diameter wheels are especially desir where crankshaft line bearings are to ground as their use considerably creases the amount of time required wheel truing and wheel changing.

The Type D hydraulic system is of dual cylinder type. It provides a w range of work table speeds with smoo ness of traversal at any speed betw the minimum of 6 inches per min and the maximum of 240 inches minute. Due to the use of dual cy ders (one for movement in each dir tion), the volume of oil in each is co stant and the speed is therefore consta in both directions. Table speeds regulated by a convenient valve whi governs the flow of oil from the end one cylinder to the corresponding end the other. The hydraulic straight infe mechanism is available, altho it is considered standard equipment. It a feature almost indispensable f straight infeed grinding operations su as crank-shaft line bearing grindi multiple wheel grinding and most w wheel grinding. When used, it ca the wheel to feed in rapidly until it about to come in contact with the wo at which time it slows down automati ally to the predetermined grinding fe



Landis Type D Plain Hydraulic Grinding Machine

nd continues to feed in at this slower ate until the base comes against the ositive stop. Reversal of the control auses the base to feed rapidly back to s starting position.

The final work drive; that is, from he jack shaft to the face plate, is thru ultiple V belts. Thereby the smooth ill delivery of power is assured, re-ardless of the load or variation of the ad. The work drive motor is of the onstant speed type, a range of 65 to 00 r.p.m. being available simply by he changing of an easily accessible belt nd pulleys at the end of the headstock. he work carriage ways are flood lubri-ated. A small reservoir at the rear of he machine is kept continuously filled ith filtered oil from the hydraulic sys-m, the oil feeding by gravity to the ays.

The Type D Machines are convenient o operate, inspect or service. The work enter line of the 10-in. Machine is but 5 inches from the floor. On the 14-in. achine this distance is 38 inches, on he 16-in. machine, 39 inches. Particu-arly when parts of considerable weight, uch as large spindles or crankshaft line earings, are being ground, the short lt conserves the operator's energy tre-endously. The lower portion of the ed is cut out in front, giving toe room o that the operator may conveniently et close to the machine. In addition o this, the various controls are fitted ugly against the bed and covered with he smooth cover. All of the hydraulic ontrols are at the front of the bed, ehind one cover. The entire pump rive is mounted on the outside of the ed at the rear. The wheel spindle drive ay be gotten at quickly by the re-oval of one cover, while a cover at he front of the wheel base, when re-oved, exposes wheel spindle, bearings nd wheel spindle bearing lubricating ump.

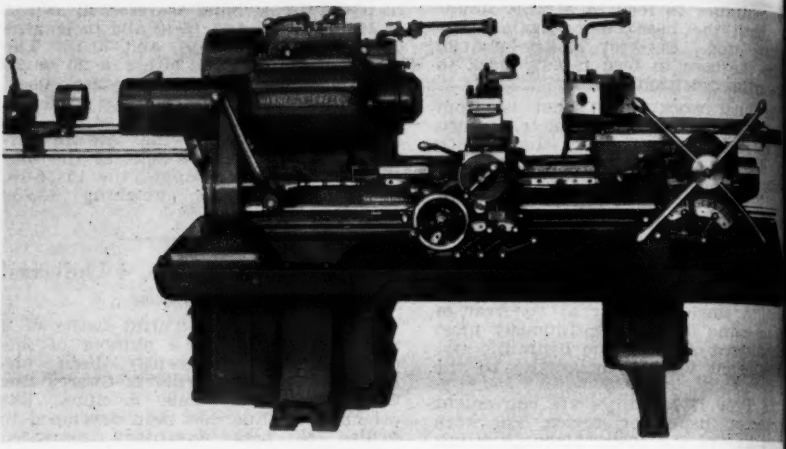
The new Type D Machines are offered in hydraulic or hand traverse, in swings of 10-in., 14-in. and 16-in and in lengths of 18-in., 36-in., 48-in. and 72-in. The wheel drive motor is either a 20 or 25 h.p., depending upon the wheel used. The pump drive motor is 3 h.p., and the work drive motor either 1 or 1½ h.p. depending upon the swing. All are constant speed motors. Weight of the machine is more than ample, the 10x36-in. size, for example, weighing 12,850 pounds, net.

Warner & Swasey No. 4 Universal Turret Lathe

A No. 4 Universal Turret Lathe of a new size, embodying a number of improvements, has recently been announced by The Warner & Swasey Co., Cleveland, Ohio. This machine, like others in its line, has been developed to utilize to best advantage cemented tungsten carbide, in addition to high-speed steel cutting tools. It has 12 spindle speeds which range from 30 to 751 r.p.m. and a 7½ h.p. motor may be used. Provision is also made for the application of a two-speed motor, giving an additional 12 speeds. It is a stronger machine throughout with increased capacity—swing 18¼-in. and bar capacity 1¾-inch.

Anti-friction bearings are found throughout the head of the machine with the front bearing of the spindle mounted on double roller bearings. All head gears are of chrome nickel alloy steel, hardened and ground. Hardened steel strips in the turret saddle are replaceable—making this a wear-proof unit. The circumference binder ring automatically clamps the turret after indexing. The travel of the turret slide is 12 inches, with the power feed applied through a friction clutch.

A feature of the cross slide is its large dial so graduated that 1/16-in. move-



Warner & Swasey No. 4 Universal Turret Lathe

ment of its rim advances the slide 0.001-in. A new automatic indexing square turret offers increased speed in manipulation. Pressure lubrication with grease is used in both aprons which keeps the bearings clean and prevents washing away of the lubricant. A plunger pump on the cross slide lubricates both the slide and the bed ways.

The gear box, grease-lubricated throughout, is equipped with pick-off gears, making it possible to change the entire range of feeds provided by the alloy steel gears found in each apron.

The ratchet type bar feed is designed for fast operation at high spindle speeds. Bar stock is held firmly concentric with the spindle bore by a revolving feed chuck mounted on anti-friction bearings, affording greater speed in loading and less fatigue to the operator in releasing and gripping the bar.

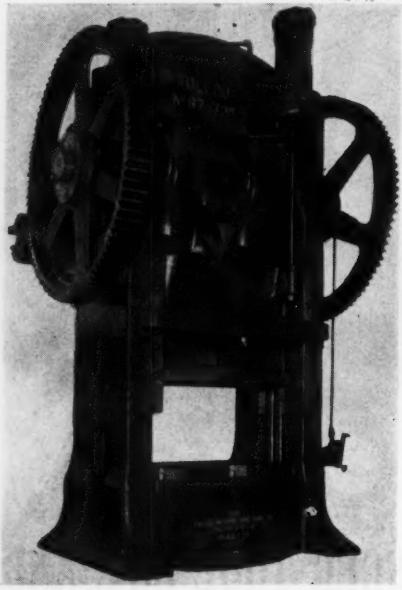
All levers are centrally located for ease of operation. Only natural movements are needed—head levers move horizontally and feed levers move vertically. All feed levers are designed with finger-tip control. This design tends to induce the operator in production actually to shift to the most productive feed instead of coasting along on one feed for all diameters. The result is increased output. Direct spindle speed reading for head levers allows rapid manipulation and completely eliminates charts or diagrams and letter symbols to determine the revolutions of the spindle.

Distinct improvements have been made in the taper attachment, making it usable for all cross slide to mounted at front and rear positio This unit is of very rigid constructio and may be clamped from the operato position.

Materials used in the machine a carefully selected to promote long li and resistance to wear. The lathe b is made of high tensile nickel iron wi a very high percentage of steel. A

Close View of Head, showing Visual Speed Selector

gears throughout are of alloy steel an heat treated. The spindle and all shaft in the head of the machine are equippe with anti-friction bearings.



Toledo No. 97 Twin-Driven Punch Press

Toledo No. 97 Twin-Driven Punch Press

Considerable effort is being made by The Toledo Machine & Tool Company, Toledo, Ohio, to smooth out the lines of its presses and eliminate corner and dust pockets wherever possible. While this necessarily improves the appearance of the equipment there is back of it a carefully worked out plan for increasing the strength of sections for distribution of the metal in the most efficient manner and elimination of any possible strain lines by the use of ample radii. The No. 97 Twin Driven Press shown is one of the latest designs and is an extremely compact and rugged machine.

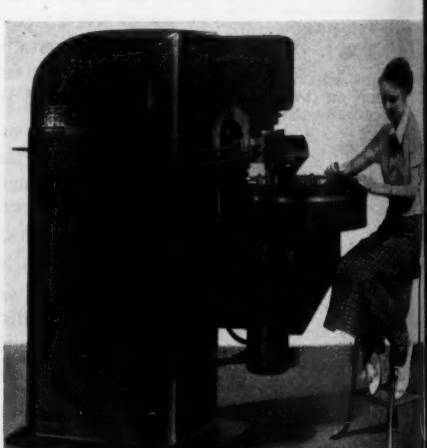
Frame members are high test alloy castings of exceptional tensile strength and surface hardness. A high modulus of elasticity obtained in these alloy castings makes possible much greater stiffness of bed and slide members than has been practical in the past. Shrunk steel rods are designed to protect the press from overloading on the heavy bottoming operations for which it is employed. The press is equipped with mechanically controlled self-adjusting pneumatic friction clutch. The very snappy action of this clutch permits a considerable increase in production rate over the older clutches. The equipment also includes pneumatic counterbalance cylinders, cross bar knockout in slide and direct-connected liftout in the bed.

Taylor-Winfield Automatic Electric Resistance Heating Machine

The machine illustrated—a product of The Taylor-Winfield Corporation, 1438 Third Ave., Detroit, Michigan—was designed to heat, electrically, tapered studs made from screw machine stock for subsequent hot forming in a press. Meeting a demand for 1,000 heated studs per hour, the actual current dwell for the heating of two pieces simultaneously is less than three seconds. A 75-watt transformer is used, mounted within the base.

In principle and construction, the machine follows the general arrangement of Taylor-Winfield spot or projection welders. The base and other parts of the frame are made of welded sheet steel which, while having the appearance of cast metal, is lighter and stronger.

Except for feeding of the studs by hand into the indexing fixture, the operation of the machine is entirely automatic. The dial mechanism is operated by a small motor through a gear reduction, moving the dial from station to



Taylor-Winfield Automatic Electric Resistance Heating Machine

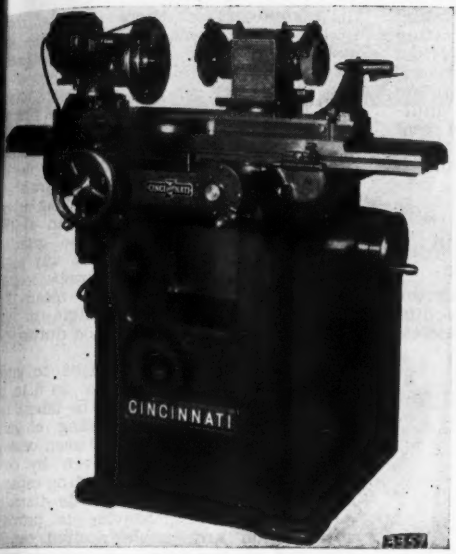


Fig. 1—Front view of Improved Cincinnati No. 2 Cutter and Tool Sharpening Machine.

station at a speed convenient for loading. The upper electrodes are brought to bear on the studs by means of an air cylinder operated from the dial indexing mechanism, all movements being so synchronized that no attention from the operator is necessary. After the studs have been heated to the desired predetermined temperature, they are ejected by air into an inclined chute which carries them to the press for the hot forming operation. The length of current dwell is governed by an electronic timer.

Similar equipment is made for a variety of heating operations, both large and small, and for practically any shape of material. The process is well adapted to the production heating of wire or slugs from which bolts are made; especially for metals not suitable for cold forming. Electric resistance heating concentrates the heat where it is needed since the heat originates in the metal, and there is comparatively little waste of energy. It is controllable, clean, economical, and efficient, and eliminates uncomfortable room temperatures.

Improved Cincinnati No. 2 Cutter and Tool Sharpening Machine

The Cincinnati No. 2 Plain and Universal Cutter and Tool Sharpening Machine, built by The Cincinnati Milling Machine Company, Cincinnati, Ohio, U. S. A., and illustrated in Figure 1, has been improved by the adoption of a solid and heavier table slide and by the addition of duplicate operating controls on the left side of the machine when facing the machine from the rear. In the grinding of large rotary cutters, which this machine is well able to handle, the solid and heavier table slide reduces vibration to a minimum, resulting in a truer and more even cutting edge. The solid table also permits heavy loading when the table is displaced angularly as in the grinding of dovetail milling cutters.

The addition of left hand operating controls increases the adaptibility and universality of this machine. Regardless of the type of work, a normal operating position is always possible. In addition, the machine retains such indispensable features as correct location of the work and tooth rest with respect to the right approach to the grinding wheel, unlimited visibility of the work and grinding wheel, accessibility to make changes

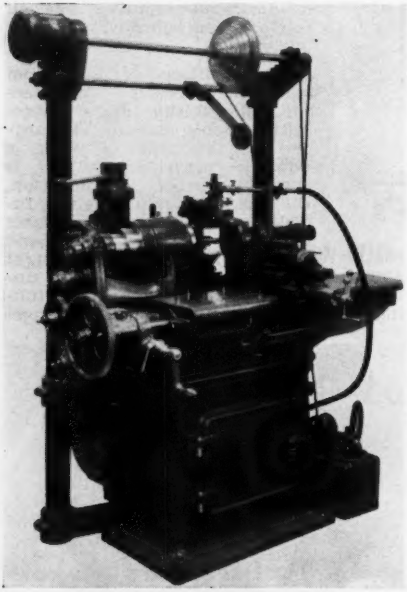
Fig. 2—Duplicate operating controls on the left side of machine. The grinding of left-hand end mills or face mills is simplified by eliminating the necessity of a makeshift tooth rest set-up.

in the setup and to true the grinding wheel without leaving the operating position, and lastly, safety of operation.

No control brings the operator's hands in dangerous proximity of the grinding wheel. The grinding of left-hand milling cutters and spiral reamers is best handled from the left-hand side of machine when facing the machine from the rear.

Societe Genevoise Toolroom Thread Grinding Machine

The illustration shows a motor-driven toolroom-type thread grinding machine which is now being made by the Societe



Societe Genevoise Toolroom Thread Grinding Machine

Genevoise d' Instruments de Physique and marketed through the Triplex Machine Tool Corporation, 125 Barclay St., New York, N. Y. The machine is intended for finish grinding high precision screw threads for external and internal gages and taps or for grinding hardened thread parts for production.

The machine is powered by a 2-h.p. motor which is mounted at the rear of the bed, the drive extending to a backshaft and from there to the cone pulley on the machine, providing six workhead speeds. Eight wheel spindle speeds are obtained by the use of a grooved pulley on an overhead shaft this shaft being driven by a 1-h.p. motor.

The accuracy of leadscrews is assured to within 0.0001 in. through the use of a master leadscrew which is protected from dust and dirt. A correcting device on the leadscrew can be seen at the front of the machine. The grinding wheel head can be tilted to any angle of helix. A vertical microscope located above the wheel provides means for controlling the profile angle of the wheel and of the work-piece during the grinding process.

The machine can be used to grind male threads from 3/16 in. to 6 in. in diameter and up to 12 in. in length between centers. The grinding of male threads is accomplished between centers, the work-piece being driven by dogs. For female centers, the grinding capacity is from 1¼ in. to 5 in. inside diameter. A diamond truing device is provided with which any angle desired can be obtained on the wheel. A suitable water pump and piping are standard equipment.

Landis Model O Chaser Grinder

The Landis Machine Company, Waynesboro, Pa., has enlarged its line of machines and fixtures for grinding Landis die head chasers by the addition of the Model O Chaser Grinder illustrated herewith. This grinder is suitable for grinding all Landis die head chasers up to 1¼ in. in width.

The Model O grinder is a medium size machine of the bench type, but it can be furnished with a pedestal for floor use if desired. It is equipped with a 1/3 h.p. a.c. single phase 120 volt 60 cycle fully-enclosed motor, suitable for plugging into a light socket. The motor and grinding wheel spindles are mounted in ball bearings. The motor has a ½-hour continuous duty rating, which is ample for the ordinary requirements of chaser-grinding.

The machine is fitted with two grinding wheels, one being a 6x2-in. cup-shaped wheel, and the other a 7x½-in. straight wheel of suitable grade and grain for grinding high speed steel chasers. The right hand side of the machine is fitted with a fixture for grinding the rake and lead angles. Means are provided for swiveling the fixture to obtain the desired angles

MACHINE TOOL BUILDERS

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ON September 11 the production world turns its eyes to Cleveland for the nation's greatest of all industrial expositions. For your benefit, manufacturers are assembling new tools and accessories for a running demonstration in a quarter million square feet of floor space.

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AS a "preview" to this gigantic exposition, the August issue of MODERN MACHINE SHOP will be devoted exclusively to the Show. Illustrations and descriptions of new tools and equipment, complete floor and booth plans, lists of exhibitors and personnel, and many other features will make the August issue *your personal guide to the Show.*

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YOUR August copy will be sent to you on August 20. Slip it in your pocket . . . take it to the Show for a guide and reference.

●

Plan Now to Attend

Your August copy of MODERN MACHINE SHOP will be your personal guide to the Show.

Landis Model O Chaser Grinder

Graduations are provided to facilitate the accurate grinding of these angles.

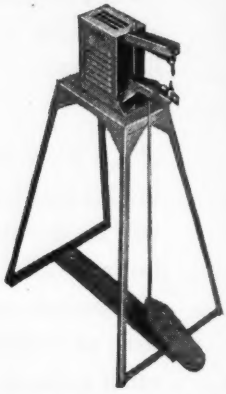
The fixture is mounted on a rotatable spindle which permits oscillating the chaser against the face of the cup wheel for the grinding operation. A cross feed is obtained through a hand knob on the left side of the machine bed. The spindle bearing of the fixture is fully enclosed to protect it from dust and dirt. The chaser is held in the vise by its dovetail shape and is securely tightened in place by means of a hand knob.

An adjustable fixture is also attached to the left side of the machine for grinding the "lip" in the rake angle. A grinder is attached to the table of the fixture to control the lead angle and thus insure uniform grinding. The Model O grinder provides for all forms of grinding Landis chasers as recommended in the Landis handbook.

"Ace" Electric Spot Welders

The Pier Equipment Manfg. Co., 1278 Milton St., Benton Harbor, Michigan has placed on the market a line of spot welders for either job, maintenance, or production work. The welders are smaller in size than the usual type of spot welder, but the manufacturer claims that the welders are built to stand up under continuous production on jobs where from 16 to 26 gauge steel is used.

The "Ace" Welder is now available in two sizes. The No. 40 welder is built complete with pedal control and steel stand, for 110 or 220 volts, 60 cycles, and will handle up to 600 welds per hour on 24-gauge steel. The No. 50 welder,



"Ace" Electric Spot Welder

with pedal control and steel stand is for use on 220 volts, 60 cycles, and will weld up to 1200 welds per hour on 24 gauge steel, or about 600 welds per hour on galvanized iron.

Valley Ball Bearing Motor-in-the-Head Buffers and Heavy Duty Grinders

The Valley Electric Corporation, 4221 Forest Park Boulevard, St. Louis, Missouri, is now marketing a line of heavy duty buffers and grinders powered by a motor that is built into the head. Motors are of the "Valley" heavy duty ball bearing type, either 220 or 440 volts, 2 or 3 phase, 60 cycle. Both grinders and

Valley Ball Bearing Grinder

buffers are built in 4 sizes, either 1, 2, 3, or 5 h.p. The size of the shaft in all cases is 1¼ inch.

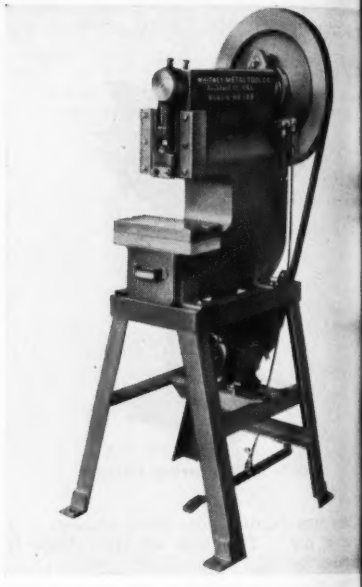
The distance between wheels on the grinder is 20, 21, 23 and 24 inches respectively for the four different sizes and the distance between wheels on the buffer is 27, 28, 29 and 30 inches respectively. The height from the floor to the center of the shaft is 37½ inches for the 1 and 2-h.p. machines and 38½ inches for the 3 and 5-h.p. machines.

The maximum diameter of the wheel in the grinder ranges from 12x1½ from the smallest size to 14x2½ inches in the largest size. Guards adjustable to the wear of the wheel can be supplied for the grinder upon request.

Your August copy of MODERN MACHINE SHOP will be your guide to the Machine Tool Show, to be held in Cleveland Sept. 11-21. It will not be placed in the mails until August 20.

Whitney Heavy Duty Punch No. 128

The Whitney Heavy Duty No. 12 Punch shown in the illustration has been placed on the market by the Whitney Metal Tool Co., 91 Forbes St., Rockford, Ill. In design and construction the punch is modern, strong, and durable, yet of comparatively simple construction. It is built of steel plates of welded box-type design, the safety



Whitney Heavy Duty Punch No. 128

factor for the frame being over 100 per cent of its greatest capacity.

The fly wheel is at the rear of the machine so as to avoid interference with work. A metal drawer is provided to catch slugs. The punch comes equipped with a gear reduction self-contained motor, V-belt drive, 3-station clutch pins in the flywheel, adjustable brake shoe on the main shaft, and a safety device to prevent the ram from descending when changing punches and dies.

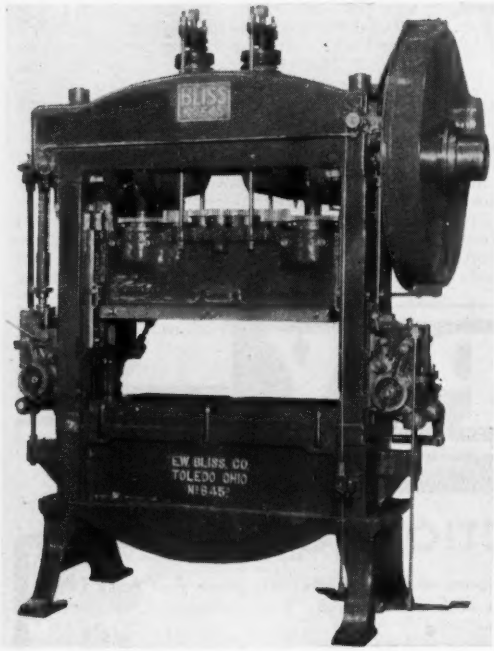
The main shaft is of SAE steel and 1¾ inch diameter. Length of stroke 1¼ in.; length of ram, 7½ in.; stroke adjustment, 1¾ in.; depth of throat 8 in.; die space with stroke down, adjustment up, 4 in.; size of bolster plate

¼ x 6 x 12 inches. Size of flywheel, 0 in.; speed of flywheel, 135 r.p.m. eight from floor to center of shaft, 52 .; total weight, 710 pounds.

Bliss High Production Press

The announcement of an addition to s line of high speed automatic presses made by the E. W. Bliss Company, 00 Hastings St., Toledo, Ohio. The new achine has a width between housings f 48 in., adapting it to use of follow es of considerable length. The press regularly rated from 45 to 65 tons, epending upon the character and duration of the load. It is regularly arranged with a multiple speed or variable speed drive for operating speeds up to 250 or 300 strokes per minute for the non-geared machine and up to 150 or 175 strokes per minute for the longer stroke geared machine for drawing operations of appreciable depth.

The use of heavy sections, special gibbing of an extremely accurate type, the double crank construction with heavily ribbed crown and the shrunk tie rod frame contribute to obtaining record die life figures, which is an extremely valuable feature where expensive multiple



Bliss No. 645D High Production Press

operation tools are used. The equipment includes high speed type double roll feeds, substantial scrap shear with blade clearance adjustment, spring counterbalance for the slide, automatic force feed lubrication and a foot controlled starting mechanism which is essential for efficient production on strip-feeding and is an extremely convenient feature in starting and restarting of coil stock.

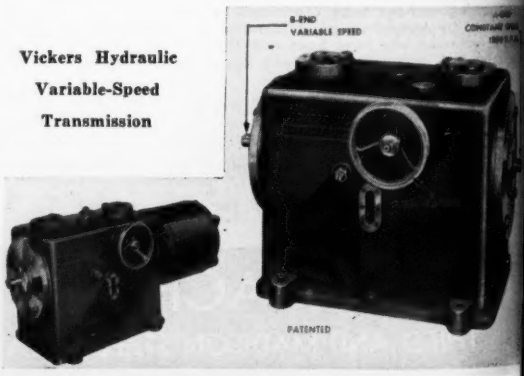
Vickers Hydraulic Variable-Speed Transmission

The illustration shows a hydraulic variable-speed transmission, now being built by Vickers, Incorporated, 1400 Oakman Blvd., Detroit, Mich., with which any desired speed between 5 and 750 r.p.m. can be secured accurately, instantly, and smoothly simply by turning a hand-wheel. Additional adjustments permit speeds up to 2500 r.p.m. Hydraulic, mechanical, or electrical remote control can be substituted for the manual control shown.

The unit shown has a maximum output of 6 h.p. continuous duty at 1,000 lb. per sq. in., and 7½ h.p. intermittent service at 1250 lb. per sq. in. Larger units will be available later.

The drive is a direct-connected 1200 r.p.m. motor, which is less expensive than slower speed motors; no belts, pulleys or speed reducers are required. The power required is always at a minimum regardless of the load because the torque is automatically controlled and there is no throttling or bypassing of the oil. The end shafts can be provided for rotation in either direction, and the direction can be changed on the job without the necessity for extra parts. Units can also be provided with mechanism for instantaneous change of direction.

The unit is totally enclosed, thus no working parts or piping are exposed and the transmission is unaffected by moisture or dirt in the atmosphere. Overall dimensions of the unit shown are 25[illegible] x17⅛x17½ in., but the dimensions can be varied to suit the individual requirements. Because oil is the fluid, all working parts are self-lubricating.



Vickers Hydraulic Variable-Speed Transmission

Despatch Convected Air Tempering Furnace

Savings of upward of 50 per cent on operating costs, more uniformly heated parts, faster production, and smaller investment in tempering and drawing equipment are said to be possible as a

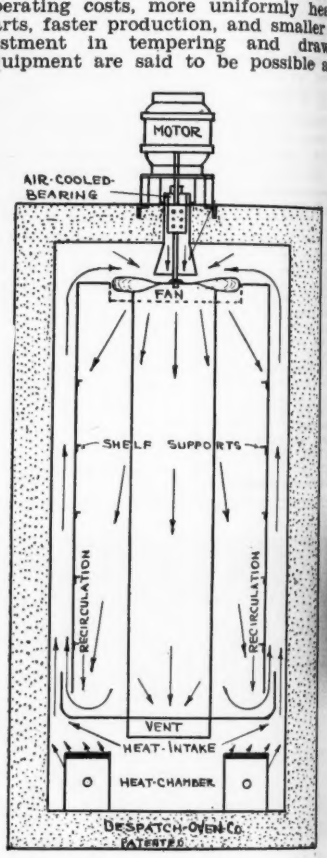


Fig. 1—Cross-section drawing of Despatch Convected Air Tempering Furnace, showing travel of air.

result of the development of the Despatch Types H and HT Convected Air Tempering Furnaces now being built by the Despatch Oven Company, 622 Ninth St., Minneapolis, Minn.

The furnaces are heated with gas, which in itself effects operating economies due to the low cost of the heat units applied to the work. Additional savings are made possible by the patented air circulating and recircula-

ing arrangement illustrated in the drawing. Up to 80 per cent of the air may be recirculated, according to the manufacturer, maintaining a temperature within 5 degrees F. of uniformity. The range is from 300 to 1200 degrees F., which is applicable for tempering and drawing operations, heat treating after carburizing, normalizing and annealing to 1200 degrees F. maximum, ageing, blueing or browning of steel parts, nitriding, and so on.

Air is the heating medium. High capacity patented fan units force the heated air downward on the parts being processed with pressure and a high velocity swirling action, penetrating all parts of the furnace and the load. The use of specially-arranged baffles ensures that the travel of the air through the furnace will be positive and that the treatment of the work will be uniform. Up to four changes per minute are obtained in the working chamber of the furnace.

The furnace is simple in design, with no costly parts to be replaced at regular intervals. The heating system consists of a Surface Combustion Standard Atmospheric Gas Burner Equipment, which is supplied for natural, artificial. Butane, Propane, and Selas Gases. Adjustment is provided for high or low fire, providing the maximum of flexibil-

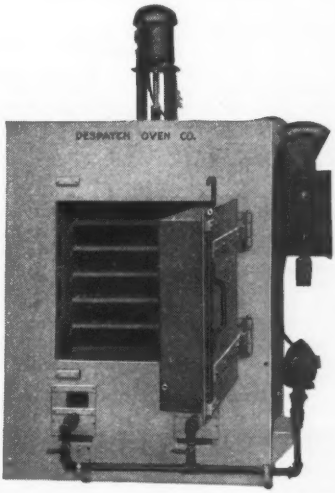


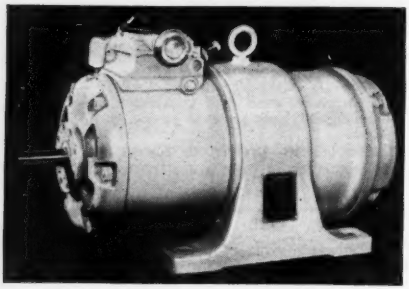
Fig. 2—Despatch Type H Special Convected Air Furnace used for treatment of bi-metal elements and small metal parts, including dies.

ity in arranging for the proper temperature over the entire operating range. Overshoot in temperature is impossible. Tempering, drawing, or normalizing at a high rate of production is assured.

New Departure Variable Speed "Transitorq"

A variable speed power unit consisting of a constant speed electric motor built in as an integral unit with a transmission the output speed of which is infinitely adjustable over its entire range has been developed by The New Departure Manufacturing Company, Bristol, Connecticut. The unit is available with either a 1800, 1200, or 900 r.p.m. motor.

In the Transitorq, hardened steel roll-



New Departure Variable Speed "Transitorq"

ers in pressure contact with equally hard steel races are utilized to transmit power. An automatic pressure device is employed which utilizes the imposed torque load itself to generate the required pressure between the rollers and the races. So sensitive is this device to the slightest change in the imposed torque that the roller contact pressure is positively maintained under either continuous, variable or shock loads in a definite proportion to the transmitted load.

Because of this automatic control of contact pressure, the Trasitorq guarantees a drive that is absolutely positive under all conditions, including extreme overload.

The rollers which transmit the drive from the constant speed input race to the variable speed output race are mounted in a non-rotatable spider. Each roller, being carried upon a ball bearing, is free to revolve about its own axis and in addition to this it may be rocked a limited distance about an axis at right angles to it. As a result, the rollers may be adjusted to any position relative to the races from the lowest to the highest speed ratio positions. It is obvious that in thus changing the position of the rollers with regard to the races, not only is the speed of the output race changed, but any speed within the limits of the low and high speed roller positions may be accurately obtained.

Since the contact pressure between rollers and races is automatically maintained in proportion to the imposed torque load, thereby assuring a positive transmission of power, it is obvious that the rollers cannot be forced from one ratio position to another no matter how slight a movement may be required. To accomplish this quickly and easily, the bearings supporting the rollers are designed to permit the rollers to be inclined slightly in such a manner as to alter their course upon the races. In this way, they roll themselves into the required ratio positions and the effort necessary to accomplish this, even with the Transitorq under full load, is no more than a finger touch on the wheel of the speed control.

The speed control mechanism mounted on the top of the Transitorq consists of two principal parts which, functioning separately or in conjunction with each other, give extreme flexibility in operation. The first part consists of an indicator dial supported on a circular, vertically disposed housing which is rotated by a worm gear either locally operated by means of a small hand wheel or by remote control. The second part consists of a rotor or vane within the circular housing and connected to a vertical shaft operating the roller shifting mechanism. At the start of the Transitorq, oil under pressure from the Transitorq pump enters the circular housing behind the vane and moves it around against spring pressure until it reaches a stop in the housing. The position of the stop depends upon the output speed indicated. With the Transitorq running, the vane is kept in contact with the stop hydraulically and operation of the handwheel rotates both parts as a unit, increasing or decreasing the speed as desired.

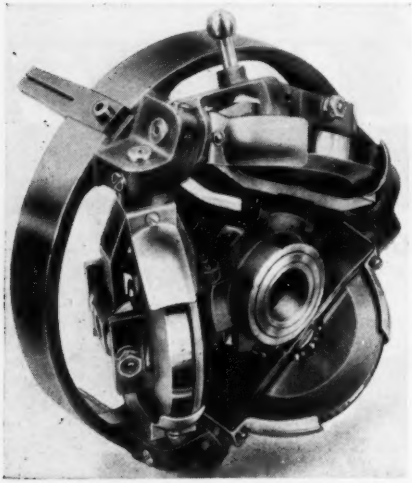
Should the Transitorq be stopped when set for any speed between high and low, the oil pressure is immediately relieved and the vane automatically shifts back under spring pressure to the low speed starting position. The flexibility of this control, therefore, permits (1) The unit to be adjusted for any speed, either before or after start-

ing; (2) The unit to return automatically to the low speed-high torque starting position whenever the power is switched off; (3) The unit to shift automatically from low to a pre-selected speed.

By means of an adjustable valve accessibly located on the speed control, the time required for the unit to change from low to any pre-selected speed may be varied to suit requirements. With the valve full open, the unit will accelerate from low to highest speed or decelerate from high to low in three seconds.

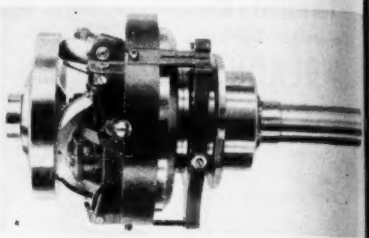
The construction of the Transitorq and speed control is such as to accommodate a wide variety of mountings. The standard leg casting may be rotated to suit either floor, side wall, or ceiling installation. The speed control, always on top of the unit, may be rotated in a horizontal plane to give practically any desired angle of the speed control mechanism for either local or remote control. The Transitorq may be built in as a part of a machine by removing the legs and locating by the same flange and surfaces used to support the leg casting.

For installation in which the Transitorq is to be mounted within convenient reach of the machine operator, the speed control, located on the top of the unit, is fitted with a small handwheel which can be rotated by a touch of the finger. Output speeds corresponding to the ratio changes obtained by movement of the handwheel are easily read on the dial of the control.



Non-Rotatable Spider in Which the Rollers That Transmit the Drive From the Constant Speed Input Race to the Variable Speed Output Race Are Mounted

When the Transitorq is to be mounted beyond reach of the operator, the hand



The Contact Pressure of the Rollers Upon the Races Is Automatically Regulated by This Device, Maintaining It Exactly in Proportion to the Imposed Torque Load

wheel on the speed control is removed to permit connection of a flexible shaft. A dial and handwheel at the other end of the shaft is then mounted so as to be within convenient reach on the driven machine.

On machines which require a variable speed drive with the speed changes occurring at irregular times, cam operation of the speed control may be applied, variations in cam contour and speed being worked out to suit any conditions within the speed range and minimum shifting time of the Transitorq. Power required to drive such a cam is insignificant, a 1-1000 h.p. shaded pole motor being sufficient even with the Transitorq under full load. Where it is necessary for an operator to control one or more machines located at a distance, remote control is readily accomplished by electrical equipment.

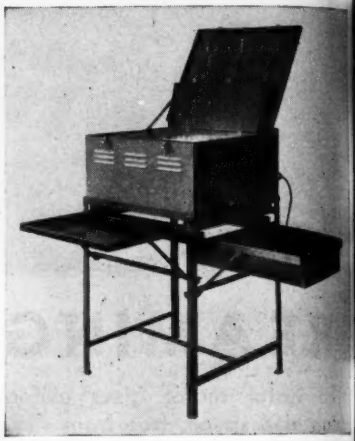
The Transitorq is supplied in ten different sizes in horsepower capacity ranging from ¼ to 20 horse power.

Milligan & Wright Floor Model Blueprinter

A new model of the Angstrom Lamp Blueprinter is announced by Milligan & Wright Co., 4618 Prospect Ave., Cleveland, Ohio. This one is a floor model with a novel arrangement for the washing and fixing trays and drying boards provided in the base. The photograph shows these trays extended for use. They can then be slid back into

the base so that the floor space required is only 28x30 inches.

The use of an incandescent lamp for blueprinting has long been recognized as the means of utilizing simple inexpensive equipment, capable of being plugged into any 110 volt A.C. or D.C. light socket, but heretofore the long exposure required made it impractical. This equipment produces prints with



Milligan & Wright Floor Model Blueprinter

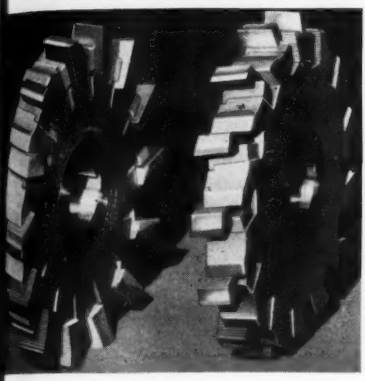
exposures of ¾ to 1½ minutes depending upon the drawing and paper used. The time switch which cuts off the current at the end of the exposure further simplifies the operation. Model 200 has a capacity of one 18x24-inch or several smaller prints at one time.

Ingersoll Zee Lock Side Milling Cutters

The new Ingersoll Zee Lock Cutter Blade recently introduced by the Ingersoll Milling Machine Co., Rockford, Ill., has now been applied to inserted blade side milling cutters. Securely retained in the cutter housing by a z-shaped wedge, which hooks the front of the cutter body and the back of the blade it is impossible for the blade to shift backwards or inwards away from the cut. The back hook of the wedge is on a slant so that when the cutter blade is reinserted and moved out a serration it moves forward a slight amount, compensating for the slight amount of wear on the face of the cutter. No additional parts or shims are required for resetting

The blade is adjustable in proper proportional directions of wear. The wedge is the locking member and is not disturbed by the thrust of the cut as this is absorbed by the serrations. The serrations further increase the area of frictional contact for locking.

Half side milling cutters, made right or left hand as shown, incorporate the Zee Lock cutter blade. Staggered tooth



Ingersoll Zee Lock Side Milling Cutters

alternate angle cutters, used for slotting or keyway operations, may be readily resized for width, as the alternate Zee Lock cutter blades move axially when adjusted radially for wear, as shown on the accompanying line drawing. Plain side and interlocking cutters

Drawing showing method of locking Zee Lock cutter blade.

with plain wedge locks are also offered. Cutters are made as small as four inches diameter by one half inch wide.

The replacement cost of a new set of blades is considerably less than the cost of a new cutter, even if made solid. In the larger cutters, over seven inches

diameter, the inserted cutter is even cheaper in initial cost than the solid. Inserted blade cutters generally offer superior cutting advantages as the small inserted blade cutters are easier to heat treat than the solid. The cutter housings of Ingersoll Zee Lock cutters are made of forged and heat treated chrome molybdenum alloy steel, which is tough and strong.

All Ingersoll side milling cutters are made to the American milling cutter standards. They are furnished with cutter blades of specially selected forged, hardened and ground high speed steel, or super-cobalt high speed steel; also with cutter blades of "J" Metal Stellite or tipped with cemented carbide. All Ingersoll Zee Lock cutter blades are of standardized dimensions so that when blades of corresponding thickness are worn in a larger cutter, they may be transferred to a smaller cutter.

Udylite "Handiplater"

The illustration shows a small, inexpensive plating unit of simple design, intended for use in plating occasional small lots of work or for the production plating of very small parts. This unit, called the "Handiplater", has been placed on the market by The Udylite Company, 1651 East Grand Blvd., Detroit, Mich.

The capacity of the work cylinder up to 25 pounds. The cylinder is tachable, which makes possible the of any plating solution in the same inder. By rinsing the cylinder well

Udylite "Handiplater"

tween plating operations, the same inder can be used for cadmium, copp or other plating solutions, or for dry or tumbling.

The unit is powered by a 1/6-h motor, which can be plugged into light socket. Sturdy and compact, Handiplater takes up but little ro and can easily be placed out of the w when not in use.

"Spra-Bonderizing"

Supplementing their well-known i mersion Bonderizing process, the Par Rust-Proof Company, 2204 East M waukee Ave., Detroit, Mich., is announ ing a new method of application cal "Spra-Bonderizing".

Heretofore, Bonderizing was always complished by the immersion meth in still tanks, either by submerging production on racks, or by passing articles to be processed through a ta tank on a conveyor, which requir from two to five minutes in the soluti depending on the nature of the arti being treated.

Spra-Bonderizing chemically produ a typical rust-resistant phosphate co ing that provides an adherent base

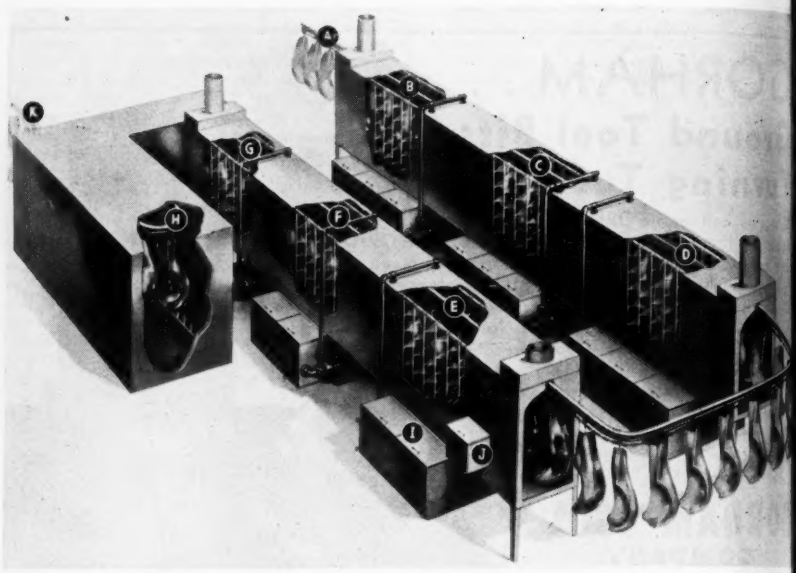


Illustration shows the complete Spra-Bonderizing process from cleaning to drying. A—Production Entering Cleaning Section. B—Alkaline Cleaning. C—Rinse. D—Rinse. E—Spra Bonderizing Section. F—Clear Water Rinse. G—Acidified Rinse. H—Drying Oven. I—Tan for Spra-Bonderizing solution. J—Tank for replenishing of Spra-Bonderizing solutio K—Bonderized Production Leaving the Drying Oven Ready for Final Finish.

paint, enamel or lacquer. The process is accomplished by spraying the processing solution onto the production as it passes through the Bonderizing section of a completely mechanized conveyor line, including cleaning, Bonderizing, rinsing and drying.

The new process makes possible the production of phosphate coatings at lower temperatures and lower chemical concentration than has ever been possible by an immersion process. The pressure spraying accelerates the chemical reaction and produces both a cleaning and coating action in one operation. Processing time has been reduced to sixty seconds as against two to five minutes by immersion.

Due to shortened processing time, equipment requirements are minimized, steam requirements are lower, less floor space is needed, and by recirculating the solution, it is possible to process a given amount of work with a smaller volume of solution.

As the work progresses on the conveyor line through the various steps of cleaning, Spra-Bonderizing and rinsing, it passes a series of small standpipe sprays which force the solution against the material from every conceivable angle, flooding all areas to be treated. The equipment is assembled in a steel housing with reservoirs below, where solutions are accumulated, ready for circulation. All pumps, valves, pipes, tanks, motors and similar equipment are standard and need not be produced from expensive alloys.

Armstrong Now Marketing "Ideal" Line of Chain Tongs

Armstrong Bros. Tool Co., 328 N. Francisco Ave., Chicago, Ill., has taken over the complete line of "Ideal" chain tongs formerly marketed by the Carrier Engineering Corporation. In taking over the line, Armstrong Bros. the name "Ideal" is retained. The complete line is now carried in stock and immediate delivery can be made on orders.

The feature of the "Ideal" chain tong consists in that the jaws are made with double-angle teeth, straight teeth for gripping pipe, and teeth cut at an angle for gripping fittings. The jaws are dro

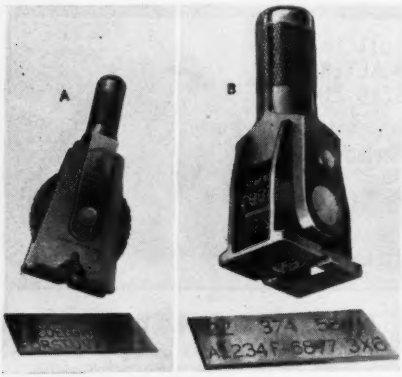
forged from high grade tool steel, and are easily sharpened when necessary. All slack of chain is taken up between the chain support and the front of the jaws, and the radius of the biting surface enables the operator to obtain the maximum of grip. All parts are interchangeable and repairs are quickly and easily made. The chain is of the best tested quality and is held by a loose removable pin made of special tool steel. The handles are forged from spring steel selected to give the required stiffness.

"Ideal" Chain T

"Quality" Self-Contained Metal Marking Machines

The Quality Die Company, 93rd s Baltimore Ave., South Chicago, Ill., announced two new type machines the marking of metal and metal pro ucts. One machine contains all the l ters of the alphabet and the numer digits 1 to 0 on a single wheel. A sin character is impressed at a time, but simply turning the wheel, any combi tion of figures and letters may stamped. Accuracy in stamping is cured by a guide opening in the face the machine, through which appear duplicate of the character to be pressed. Grooves in the base of machine serve as guides for the plac and aligning of characters on the face to be stamped.

The second machine (illustration is a multiple wheel machine. It is s plied with any number of wheels fr 2 to 9 or more, and each wheel conta



"Quality" Self-Contained Metal-Marking Machines

10, 12, or 14 characters, either figures or letters or both as desired. By turning the wheels, the characters, as they are to be impressed, can be arranged in a single straight line in any combination. Special characters can be engraved to order.

Grooves cut into the face of the wheels between the deeply engraved charact fit over a small pin which insures p fect alignment and acts as a reinfo ment to the large shaft pin. Charact are kept in alignment by means ratchets for each wheel. A guide p enables the user to place the impress just where he wants it and makes p sible a uniform impression of all c acters.

In both the single wheel machine the multiple wheel, the shank h moves downward when marking thro the base guide and goes back into p automatically after the impression made.

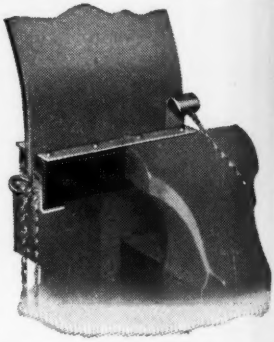
Both machines are made of speci hardened and tempered tool steel guaranteed by the manufacturers to press metals up to and including B nell Hardness No. 415. They would equally as effective on fibre, leat wood or any material that needs identification number or letter.

Clipper No. 0 Vise Belt Lacer

The Clipper Belt Lacer Compa Grand Rapids, Mich., has brought ou new model of belt lacer, in 4-inch 6-inch sizes, for use in connection w an ordinary bench vise. With this la

using a pressure plate which is part of the lacer, it is said that it is now possible to make as satisfactory a Clipper joint in a belt by using a bench vise as with the most powerful lacing machine built.

The manufacturer states that only a few minutes are required to embed the



Clipper No. 0 Vise Belt Lacer

hooks flush with the surface of the belt, and a 4-inch or 6-inch belt up to ⅜ inch thick can be laced in one operation.

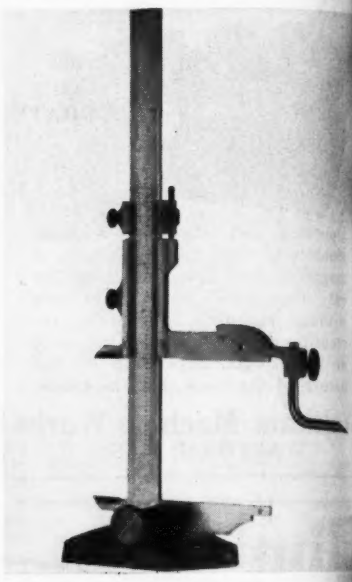
The Clipper No. 0 Vise Lacer is made of case hardened steel and flat strip steel which is cadmium-plated. The lacer which holds the hooks is of brass, and the pressure plate is of spring steel. This plate is used when the vise is not powerful enough to imbed all the hooks at once.

Mauser Convertible Height Gage

A new and improved type of Convertible Height Gage has recently been added to the line of Precision Mauser Tools which is handled in this country by the George Scherr Company, 130

Lafayette St., New York, N. Y.

The tool consists of a toolmaker's caliper of standard Mauser make which is now available with knife edge points at the rear of the jaws. For use as a height gage, a substantial lapped base



Mauser Convertible Height Gage

furnished in which the caliper is located and held by a centering clamp. The scriber readily attaches to the upper jaw. The scribing needle is of angular design and adjustable in such a way that proper setting of the scriber will result in direct reading of the scale. Verniers are provided for reading 0.001 inch and 1/128 inch respectively.

Brown-Brockmeyer Bench-type Grinding Machine

A grinding machine of the bench type designed to carry two 6-inch grinding wheels as shown in the illustration, has been placed on the market by the Brown-Brockmeyer Co., Inc., 1000 Smithville Road, Dayton, Ohio. Available in ¼ h.p. and 1/3 h.p. sizes, the units are equipped with the company's motor mounted on ball bearings. The bearings and motor are enclosed in a dust-proof housing. Wheel guards extend from both sides of the motor frame and

are fitted with end plates as shown.

The base of the machine is fitted with rubber pads, and a handle is included

Brown-Brockmeyer Bench-Type Grinding Machine

for carrying the grinder when it is to be transported from one position to another. The handle lies out of the way when not in use. Both sizes of the machine are intended for use on a 110-volt, 60-cycle circuit, and operate at a speed of 3,450 r.p.m.

"Alnor" Horizontal Edgewise Pyrometer

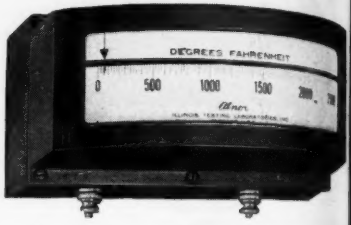
The illustration shows the "Alnor" Horizontal Edgewise Pyrometer which has been developed by the Illinois Testing Laboratories, Inc., 146 W. Austin Ave., Chicago, Ill. The construction of the instrument is such that it may easily be mounted on a wall, post, panel or switchboard, or directly on the engine if necessary. The connecting wires between thermo-couples and selector switch may be installed in any convenient manner and enclosed in a conduit if desired.

The indicator is ruggedly constructed to withstand severe vibrations, jars, and shocks. Perfect damping of the moving element prevents the pointer from overswinging or oscillating even under heavy shocks. Permanence of accuracy is said to be assured by the simplicity of design, high torque, high quality of materials, and careful workmanship.

The long 6-inch scale with its legible markings, fine pointer, and mirror which

avoids errors due to parallax permits accurate readings with ease. The indicator case is provided with a gasket of special structure which excludes moisture, fumes, or dust.

A manually-operated cold end adjusting screw is provided. When specified on order and when alloy connecting



"Alnor" Horizontal Edgewise Pyrometer

wire is used, an automatic internal cold end compensator can be furnished. Internal resistance is exceptionally high assuring freedom from errors caused by varying lengths of thermo-couple wire. The pyrometer is 7¼ inches wide, 10 inches high, and 7 inches deep. Net weight is 13 pounds.

Sheffield Visual Gage

Among the advances that have been made in production plants in the last few years has been the change from selective assembly to precision inspection, which has been made practicable through the development of the modern visual gage. Parts are gaged and classified according to exact size, the gaging being handled rapidly and economically by the use of visual gages similar to those shown in the illustration. Under such a system, no time is lost in the assembling departments. When the assembler picks up a part, he knows that it is the correct size for the fit required.

Obviously, however, such methods require precision measuring equipment with which readings may be taken instantly to tenths of a thousand of an inch and in many cases to fractions of tenths.

The No. 1 visual gage, a product of the Sheffield Gage Corporation, Dayton, Ohio, is both a rapid inspection gage for close tolerance production work and also a precision comparator by which other gages may be periodically checked. A relative movement of 0.000025 inch between the anvils covers a space of ¼ inch or one unit on the illuminated dial. A difference of 0.001 inch in any

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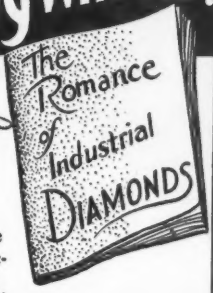

Discusses the History, Characteristics, and Classifications of Diamonds. A table is given as guide for selecting the correct size stones for all your grinding wheels.

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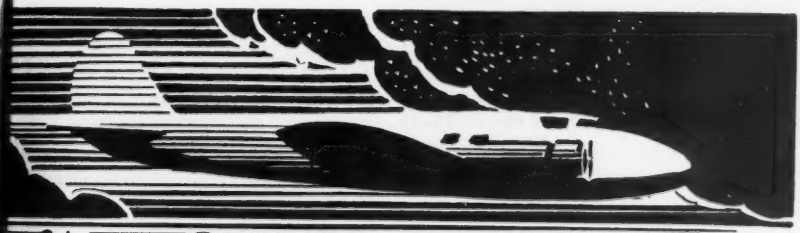

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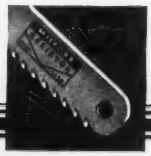
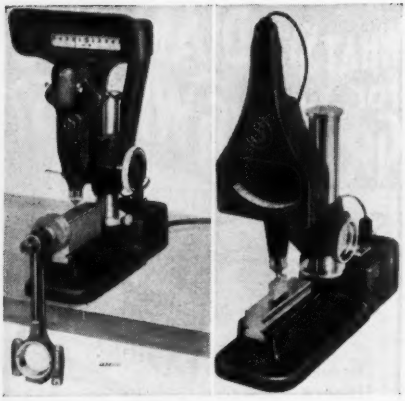


THE HENRY G. THOMPSON & SON CO.
277 Chapel St.
NEW HAVEN, CONN., U. S. A.



(Left)—No. 1 Visual Gage With Internal Attachment Checking Small End Of Connecting Rod To Tenths. (Right)—No. 3 Visual Gage Being Used To Check A Gage Block.

setting moves the indicator ½ inch along its scale. This 4000 to 1 magnification results from ingeniously obtaining mechanical and optical magnification, which in the Sheffield gage is accomplished without resorting to movable elements such as gears, pinion lever, or knife edges. No element the assembly of the gage is subject sliding friction. As a result, there no opportunity for the gage to beco inaccurate due to wear.

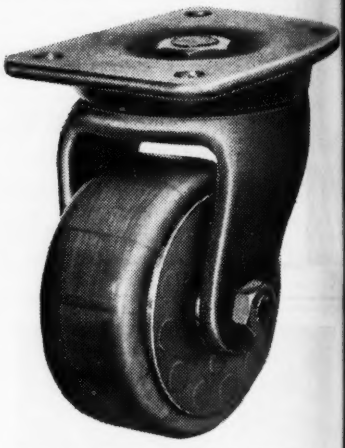
The upper gaging element is diamo tipped to minimize all effects of we The lower anvil is furnished in t interchangeable types, one flat for gaging of flat surfaces and outside cyl drical diameters; the other of a mand type, for gaging internal diameters. T flat anvil is made of Sheffield spe steel. When the gage is to be used high production inspection such as bearing rollers, piston pins, and so a strip of tungsten carbide ½ inch w is set into the flat surface of the an as an additional protection against we The mandrel for internal diameter gag carries two strips of tungsten carb properly spaced. A lower contact co sisting of a spherical tungsten carb point is set into the end of a lever wh actuates the diamond-pointed up gaging element. Thus all internal dia eters are measured on a 3-point conta

The visual gage can be used on a 110-volt a.c. 60 cycle current. A tra former in the base of the gage st

down the voltage to 8 volts for illumi
ating the reading dial. The No. 3 vis
gage differs from the No. 1 in that
operates on a 1000 to 1 magnificatio
A relative movement of 0.0001 inch b
tween the gaging elements registers
distance of ⅛ inch on the illuminat
dial; otherwise the instruments are t
same.

"Standard" Truck Caster

The illustration shows a steel forg
caster with a Metzger End-Wood wh
—product of the Metzger Company, In
Grand Rapids, Mich. The feature
this caster is that the king-pin n



**"Standard" Truck Caster With Metzg
End-Wood Wheel**

lower ball race are made from a sin
forging, banishing any possibility
king-pin trouble.

The caster can be supplied with eit
forged steel wheels which will not bre
or chip, or with Metzger End-Wo
wheels of selected and scientifical
treated hard maple. Either wheel
guaranteed unbreakable. Wheel diam
eters are 4, 5 and 6 inches.

When the caster is supplied with st
forged wheels, either the Oilite bron
type bearing or the Hyatt roller bear
is used. The Oilite bearing is
cast bronze, has a high oil conte
and unusual strength. It has an e
tremely high load capacity. A leath
and steel grease seal protects it fro
grit and dirt. The End-Wood lubrica
ing bearing never requires attention

it is an integral part of the all-wedge wheel. The Hyatt bearing is of the same precision and quality as those used in automobile transmissions.

ForgeWeld Caster

A new truck caster that operates as easily under heavy load as moderate ones, called the ForgeWeld Caster, has been brought out by the Service Caster & Truck Company, 596 N. Albion St., Albion, Mich. The top plate, yoke base and button, or thrust bearing, are of drop-forged steel. The yoke legs, extending down to the wheel, are cut from structural steel, and the units are assembled by arc-welding.

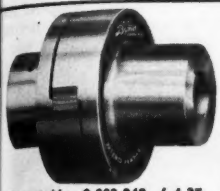
A double ball bearing swivel with

ForgeWeld Caster

hardened raceways, Hyatt roller bearing axle, and two Zerk fittings are standard equipment. The caster comes in four wheel sizes ranging from 3¼ inches to 10 inches and those wheels can be either semi-steel, Textolite, or rubber tired.

Acme Steel-Mesh Conveyor Belt

Acme Steel Company, 2840 S. Archer Ave., Chicago, Ill., has made an improvement in the construction of its open mesh steel conveyor belt which is ma



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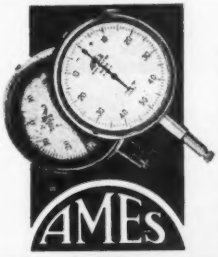

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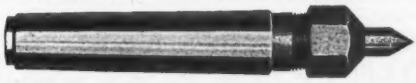
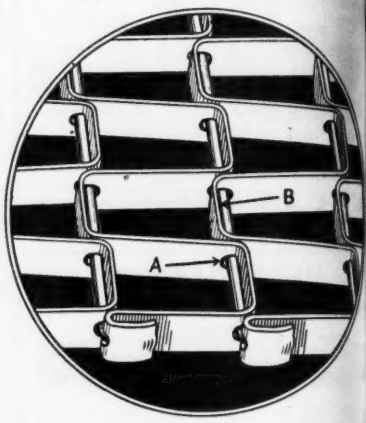


UNIVERSAL ENGINEERING CO.
FRANKENMUTH, MICHIGAN

to be of importance from a service and maintenance standpoint.

Acme belts are composed of formed spindles of flat steel, connected by pivot rods as shown in the illustration. Formerly the rods were inserted through round holes, the edge of the hole being the only bearing on the rod. To reduce the wear on the rods, the holes are now elongated to a point where the entire flat surface of the U-shaped section is utilized as a bearing, as shown. This simple change has materially increased the life of the belt and has also increased the flexibility and smoothness of operation.

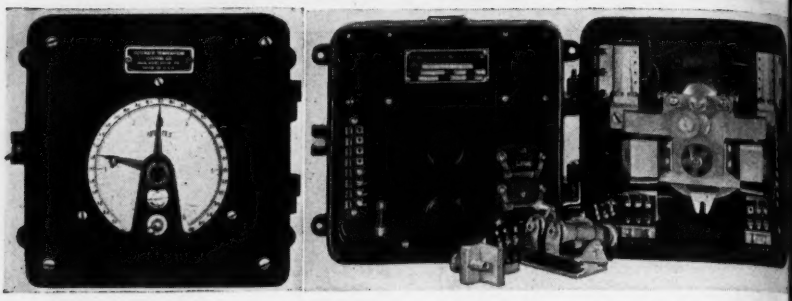
Acme belts are especially adapted for conveying products through drying ovens, for sorting and assembling operations, and similar applications. The open mesh allows for free circulation of air, heat, water, steam, or liquids, making it an ideal conveyor for handling products through washing, cooling, or drying operations. The parts are of cold rolled strip steel, electro-galvanized to resist rust, or of Acme Stainless Steel.



Section of Acme Steel-Mesh Conveyor Belt

Time Control Unit Exactly Adjustable To Job Requirements

The illustration shows the Series 1274-5-6 Time Controls now being offered by Automatic Temperature Control Co., Inc., 34 East Logan St., Philadelphia, Pa. These controls are designed to repeat one or two operations or processes as often as desired, provision has



Interior and Exterior of Series 1274 Time Control Unit

ing been made for exceedingly flexible choice of periods during which the controlled actions take place.

The time controls in this series will handle a repetitive action or operation requiring a definite time period or cycle with either the same or a different time period between successive time cycles. The time cycle and also the interval between successive cycles is infinitely adjustable with an accuracy of setting to within a split scale division of the respective dial ranges selected.

Parts have been so grouped on the chassis that adjustment is simple. Ju connections permit removal of pa without disturbing the wiring; thus s tings remain accurate despite vibrati The special contact-metal transmits c rent even when oxidized. The unit c be supplied for 110 V. A. C. or 220 V. A if required.

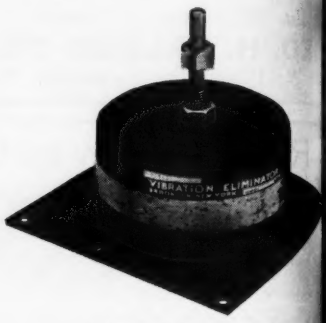
Vibration Eliminator

The illustration shows a new sho absorber or cushion for machinery, call the "Vibration Eliminator", which h

been placed on the market by the Vibration Eliminator Company, 4126 37th St., Long Island City. N. Y. The vibration eliminator consists chiefly of a sheet metal base and supporting housing to which the leg or base of the machine may be rigidly fastened. The vibration eliminator relies for its efficiency chiefly upon a new table of selected loadings on pure natural cork which has for many years been considered by engineers one of the foremost isolating materials. Adequate loadings and ease of installation are features of this eliminator.

The eliminator is made in three sizes: the No. 22, 3x3x2 in. in heighth, supplied in all loadings between 65 and pounds each; the No. 23, 4½x4½x2 in heighth, supplied in all loadings tween 100 and 200 pounds each; and No. 24, 5½x5½x2 in. in heighth supplied in all loadings between 175 375 pounds each.

Six of the No. 24 eliminators



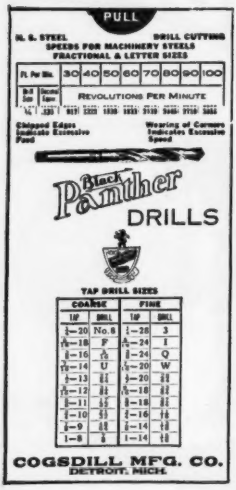
Vibration Eliminator

efficiently isolate up to 2250 pou They are easy to install; one is pl under each leg or supporting poin the machine base. The machine bolted to the vibration eliminator the eliminator is bolted to the floor.

The device is said to be durable sturdy and it is plain that the isola material, which is natural cork, maintain its efficiency during the e life of any machine. In addition, not effected by water, oils or temp ture changes. The manufacturer cl that the isolating material will not a permanent set under excessive l ing, will not further compress after initial compression, and has a " period in its return after compres which prevents any bouncing action.

Cogsdill Speed and Feed Chart

The illustration shows a vest pocket drill feed and speed chart which is being distributed by the Cogsdill Mfg. Co., Inc., 6511 Epworth Blvd., Detroit, Michigan. The face of the chart carries a table of feet per minute, and the slide lists the sizes of the drills from the smallest to the largest used in ordinary work. When the slide is pulled out to a given drill size, the chart shows the size of the drill in decimals of an inch and gives the number of revolutions per minute required to obtain any peripheral speed from 30 to 100 feet per minute. The chart also carries a table of tap drill sizes for coarse and fine thread taps.



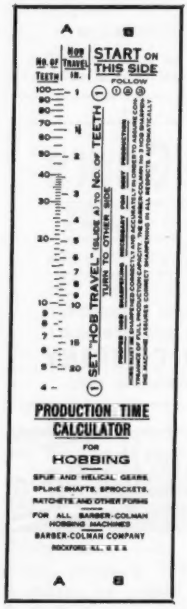
A chart will be sent free to any machine shop executive upon request.

APEX PRODUCTION TOOLS: A catalog showing and describing the complete Apex line of tools for the metal working plant has been issued by The Apex Machine Tool Co., Third and Madison Sts., Dayton, Ohio. The tools listed are production tools of the highest caliber, designed after a considerable amount of research as to the particular needs of the production plants. This catalog—the No. 8—is available to any mechanical executive, production engineer, or other tool buyer, upon request.

"LENOX" LIST No. 35: This book put out by the American Saw & M Co., Springfield, Mass., contains spec cations, descriptions, and illustrati of the hack saw blades, metal-cutt band saws, and other tools made by t firm. In addition, it contains some ful information as to the manner which work-pieces of various sha should be held in order to obtain quickest and most accurate results w sawing, and includes a table giving number of teeth per inch that a h saw blade should have in order to the best job of cutting. Copy free.

"B-C" Production Time Calcula

The illustration shows the obverse reverse sides of a "Production Time C culator" for quickly figuring the prod tion time on hobbing jobs, now be distributed to supervisors and executi of gear cutting departments by Barber-Colman Company, Rockford,



The calculator is, in effect, a spe slide-rule with which, by setting slides according to the number of te and feed, the number of minutes quired for hobbing any job can instan be determined. The calculator is

light though substantial construction, and can easily be carried in the vest pocket. The calculator can be used to determine the time required for hobbing spur gears, helical gears, spline shafts, sprockets, ratchets, and other forms produced by the hobbing process.

A calculator will be sent to any gear hobbing department executive who will request it on his firm letterhead.

SHELDON BULLETIN No. 23, issued by Sheldon Machine Co., 3255 Cottage Grove Ave., Chicago, Ill., contains a complete description of the Sheldon 1[illegible] inch lathe and accessories. The acce[illegible] sories include a taper attachment, dra[illegible] in collet attachment, collets, four-j[illegible] chuck, three-jaw chuck, drill chuck[illegible] milling and keyway-cutting attachmen[illegible] and adapters for automotive repair wo[illegible] on pistons.

In addition to the description an[illegible] illustration of the lathe, the bulleti[illegible] gives specifications for the attachmen[illegible] and includes prices. Copies free to m[illegible] chanical executives.

LANDIS TOO[illegible] AND CUTTE[illegible] GRINDER CA[illegible] ALOG No. 0[illegible] This catalog n[illegible] only contains complete and d[illegible] tailed descripti[illegible] of the 12[illegible] Landis Tool a[illegible] Cutter Grindi[illegible] Machine and t[illegible] machine par[illegible] but it also i[illegible] cludes pictur[illegible] and descripti[illegible] of a wide vari[illegible] of set-ups f[illegible] sharpening a[illegible] kinds and typ[illegible] of milling c[illegible] ters, slitti[illegible] saws, face mil[illegible] inserted toot[illegible] cutters, gear cu[illegible] ters, slab millin[illegible] cutters, fo[illegible] cutters, and ot[illegible] ers. Separate s[illegible] tions are devo[illegible] ed to circul[illegible] form tool grin[illegible] ing equipme[illegible] and spiral gea[illegible] ating grindi[illegible] methods a[illegible] equipment. A[illegible] plant executi[illegible] can obtain a co[illegible] by addressing [illegible] Landis Tool Co[illegible] pany, Wayne[illegible] boro, Pa.

Your copy of MO[illegible] ERN MACHIN[illegible] SHOP— your r[illegible] to the Machine T[illegible] Show — will [illegible] mailed Aug. 2[illegible]